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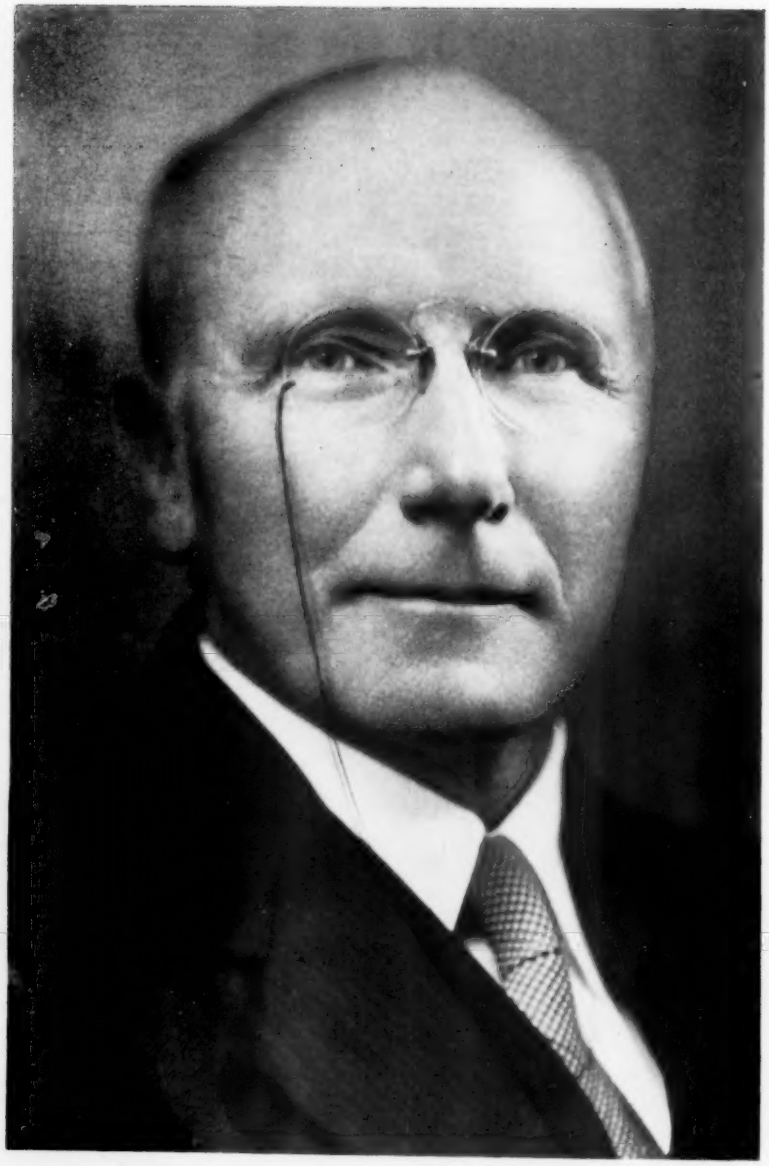
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Maggie Campbell

UNIV. OF MICH.

PERSPECTIVES IN PSYCHIATRY.*

By C. MACFIE CAMPBELL, M. D., Boston, Mass.

In all human affairs the point of view from which they are regarded makes a considerable difference. So in matters psychiatric, and in regard to The American Psychiatric Association and its annual meeting. I find the perspective from the presidential chair different from that of the care-free member, and my remarks shall deal with this new perspective.

This is the opening session of our annual meeting. The annual meeting is more than a social event, it is an intellectual feast; the menu is comprehensive, almost bewildering, a presidential address is supplied as a somewhat dubious cocktail. In the simpler times of the founders of the Association the members ate steadily through the menu, but now the atmosphere is more that of the cafeteria. One picks and chooses according to his individual taste; while some select a highly specialized fare, it is hoped that the average member after the meeting will look back on a well-balanced, palatable and digestible meal.

The program of the annual meeting, however, is not to be considered a mere collection of unrelated papers presenting the results of independent workers in their various workshops. Each worker is dependent on the thought of his time, utilizes formulations suggested by others, is stimulated by the special interest of his colleagues. The papers form part of an integrated whole. The program represents a cross-section of contemporary psychiatry. Within the general field of psychiatry there are shifting foci of special activity, foci which are not dissociated from the general activity but which exert a marked influence over the whole field. Brain potentials, detailed anatomical changes, the physical and chemical variations of blood and cerebrospinal fluid, details of the chemical equilibrium of the body, the nature of the instinctive urges, the organization of the personality, its various patterns of reaction,

* Presidential address delivered at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

its transitory disorders, its permanent distortions, the complicated play of inter-personal relations in home and school and job, the various physical, chemical, personal and social resources available for treatment—such is the diet provided by this year's program, such are the challenges to your interest and your critical judgment.

Different problems and different methods have had a varying degree of attention at different periods; at one time the practical problems of hospital administration were in the foreground, at another the varying clinical manifestations, then again the structural substratum or the nature of the physiological disturbances. Chemical studies and the experimental method have somewhat put in the shade studies by means of anatomo-clinical correlation.

The program is a stimulus to the worker in a special field, it is a challenge to the less specialized worker who aims to coordinate the specialized results and utilize them in the setting of his more immediate clinical tasks. The annual meeting offers a demonstration to the general medical profession of the present status of an important medical specialty. To the community the Association at its annual meeting offers an account of its stewardship.

At a time when the relations of the medical profession to the general needs and resources of the community are being scrutinized, each one of us must consider seriously the relations of this representative body of our specialty to the important issues of the individual life and of community organization. As he watches current events the psychiatrist sees many personal tragedies, the underlying factors of which seem clear to him, as they form the stuff of his daily work. He sees strained and antagonistic relations between parents and children, distorting and embittering the lives of both. He sees troubled marital situations where a somewhat different attitude and a broader grasp of human nature might transform the lives of both partners. In the school he studies the interplay between personality of pupil and that of teacher, and sees in this interplay the same fundamental forces of human nature which he studies in his patients. In various group movements connected with religious beliefs, social attitudes, economic dogmas or political formulæ he sees the underlying rôle of instinctive and primitive urges and attitudes, while little reference is made to them in official utterances and discussions. In labor conflicts where the discussion is officially about hours or wages or forms of organization, the urge

for power in the protagonists of the two sides, the results of early conditioning, of unresolved conflicts, of present tensions, may have much to do with the intransigent attitude which foments trouble, neglects friendly approaches, postpones reasonable settlement; while the response of the less articulate members of the group can only be understood if we know the actual conditions of their life and are sensitive to the needs of human nature and the results of its frustrations. Ruthless exploitation, anti-social behavior, stubborn conservatism and crude radicalism, phantastic beliefs, ill-balanced enthusiasms, these are merely manifestations of the human spirit working according to its definite laws under the special conditions of the individual and social life.

It is these laws which the psychiatrist is bound to search out, and the nature of his task offers him unique opportunities for their investigation. No other situation is so favorable as that offered by the consulting room, where with all irrelevant social conventions removed it is possible to lay bare the movements of the human soul.

The insight of the psychiatrist, imperfect as it is, into the laws of human behavior is of fundamental importance for meeting crucial problems which concern the individual life and the social structure. The psychiatrist has a natural desire to promote the social utilization of the psychiatric knowledge that is already available.

In the complicated field of human relations there is no single feature so startling as the mass destruction of one's fellow creatures because of conflicts as to beliefs or material possessions. Yet war is a commonplace; it is accepted by some as if it were an inevitable condition of human existence on this planet, as if human nature had some ineradicable tendency bound to express itself in recurrent outbursts of mutual destruction. With this fatalistic attitude all the skill and all the intellectual processes of man may be made subservient to the accomplishment of this destructive task.

It was therefore refreshing to hear a different note sounded by a group of men whose life task was to study the underlying urges of human nature, the results of their frustrations, the lines along which one might strive to reach a wholesome solution for the problems of the individual and the social group. This group of men started from no dogma, could not be accused of unfamiliarity with scientific method, their life had accustomed them to the exercise of critical judgment. They were familiar with the principles of the

physical and the biological sciences; they were no group of visionaries. I refer to the appeal sent out in 1935 to all the statesmen of the world by a group of 340 psychiatrists and psychologists from 27 countries. This appeal was formulated by the Committee for War Prophylaxis of the Netherlands Medical Association. This appeal to the statesmen of the world began: "We psychiatrists, whose duty it is to investigate the normal and diseased mind, and to serve mankind with our knowledge, feel impelled to address a serious word to you in our quality of physicians." The appeal includes the statement: "If war is to be prevented the nations and their leaders must understand their own attitude towards war. By self-knowledge a world calamity may be prevented."

Polite replies to this appeal were received from many statesmen. One may speculate on the actual reaction to its reception by these men in high position—a shrug of the shoulders, a tolerant smile, a sigh over lost illusions, perhaps at best a brief detached survey of its implications. These implications have not been woven into the political thought of our times. Even the terms we use seem to have a certain significance. A government has a Ministry of Health, it does not call it a Ministry of Disease; it has a Department of Education, not a Department of Ignorance. It has a War Department. Might it be possible for it to have a Department of Peace with a constructive policy, and not concentrate exclusively on the destructive possibilities in human relations?

In the absence of such Departments of Peace the Netherlands physicians turned to the individual statesmen. While they may ride the political whirlwind, the statesmen do not always direct the storm. They may be carried along by external forces over which they have little control and by inner forces into which they have little insight. The most important forces which have influenced and continue to influence the efforts, the emotions, the beliefs of individual statesmen are not necessarily to be found in Who's Who. To the statesmen the Netherlands appeal commends self-knowledge. Could every statesman with impunity carry through a relentless self-analysis? What cabinet could stand if the self-knowledge of its members were pushed beyond a certain point? The statesman has made heavy investments and is deeply committed to certain beliefs and activities, he is entangled in a mesh of action and belief

of his fellows from which his very prominence may make it impossible to detach himself. He may be immune to a rational appeal which lays such stress on self-knowledge.

The statesman probably knows his classics well enough to quote the familiar lines, *video meliora proboque, deteriora sequor.* Knowledge and reason play a great rôle in human conduct but the statesman does not need to read his Schopenhauer to realize that the crude urges of human nature may brush aside all rational considerations and even harness man's highest endowment in the service of his lowest passions.

Thus while paying tribute to the noble impulse which inspired the Netherlands appeal to the statesmen who direct the thunderbolts, we may be a little uncertain as to how far they have control of these thunderbolts and as to whether their fixed preoccupations and official entanglements may not prevent any efficient response. Sentimental regret, however, and inaction in face of grave present needs can hardly satisfy us;

> "the sin I impute to each frustrate ghost
> Is—the unlit lamp and the ungirt loin."

The challenge issued by the Netherlands physicians may cause searching of heart, and lead to clarification of our psychiatric thought in relation not only to the issue raised by the appeal, but to other social issues.

War is a big topic, international relations are complicated, humanity is a large concept. It may be wise at the beginning to realize that the scope of our minds is limited, that few can think in international terms; we use big words and feel that we are grasping large areas of space and a wide expanse of time, but these words in actuality have a marked personal and regional quality. We fail to realize the parochial limitations of our mind but talk glibly of universal peace. In view of these limitations, with peace as with charity it may be well to begin at home. Success in dealing with the more immediate problems may fit the individual and the community to deal more adequately with the wider problems; it may even enable the statesmen to deal in a more rational and objective way with problems which involve the peace of nations.

The members of this Association in their daily work have constantly to deal with peace and war. It may be the peace of mind

of the individual that is at stake or the harmony of the family group, or it may be a question of conflict in a broader social setting. Even at the physiological level one may often formulate the physician's task as that of transforming a situation of conflict between different systems into one of harmonious cooperation. At the psychological level each human soul is an arena of combat; there is the conflict between the appetites and the ideals, between the childish and the mature, between the primitive and the cultured, between the reactionary and the progressive, between the autistic and the realistic, between the egoistic and the social. In many patients the nervous or mental disorder can be formulated usefully in such terms, and the rôle of the physician is to help the patient to establish harmony between the warring elements, a harmony which does justice to the various factors and enables the individual to play his rôle in the community life. In the searching analysis involved in this procedure the psychiatrist has a unique opportunity to study the dynamics of human nature. The increased self-knowledge is a gain to the patient. The insight into the laws of human nature gained by the psychiatrist is of practical importance for the conduct of every human life, and the formulation of this knowledge and its dissemination throughout the community is a responsibility of the psychiatrist, individually and collectively. This is to be looked on as the fundamental basis of social peace, and one may scrutinize in the community the resources available for helping the individual to attain this peace of mind.

"My mind to me a kingdom is," but peace within this kingdom is not enough; the kingdom is only part of a wider territory, and the individual fate is inextricably interwoven with that of other members of the social group. The most immediate group is that of the family. Those interested in the establishment of social peace may consider to what extent the social structure, the customs, the beliefs, the organized institutions in a community foster the harmony of family life or permit or even foster discord.

The basis of family life is marriage, whereby two people enter into one of the most important and binding contracts of their lives. Its importance is officially recognized by the necessity of civil or religious sanctions. A community interested in the welfare of the individual and in promoting harmonious family life might well

consider what are the conditions which favor a satisfactory marriage and might scrutinize the social customs and beliefs and codes which have a bearing on this basic social institution and on the preparation of the individual for accepting this responsibility. Every psychiatrist has experience of marriages, sanctioned by state and church, which from the beginning had little chance of success; in an atmosphere of warfare, overt or concealed, children born in such a marriage are brought up. Serious attention to marriage as the basis of the family involves consideration of the attitude of the community towards sex in general and study of the way in which a more honest, serious and intelligent attitude towards this life issue can be developed in the community.

With regard to the relations of children to parents, parents to children, siblings to each other, the psychiatrist has many opportunities for prolonged observation. In the individual situation he may make a useful contribution; from his accumulated experience certain general principles may be formulated, which deserve to be woven into the thought and daily practice of the community. The degree to which the psychiatrists of the community are sensitive to these issues and promote the utilization by the community of the collective observations of psychiatrists in these matters may well be a major concern of the The American Psychiatric Association.

I may here pause to crave indulgence for the use of certain terms. I have talked of peace of mind, of marital and domestic peace. These old-fashioned terms may offend more delicate ears as they bring with them vague overtones of ethical nature, are not chemically or scientifically pure. Instead of peace, whether personal or domestic, one might perhaps talk of harmony or equilibrium; or the word integration may give our homely statements the protective coloration of scientific terminology. I plead guilty also to having referred to the human soul. I leave it to anyone who finds the word distasteful to choose his own symbol for certain aspects of human experience of profound personal importance.

The family is the immediate social group to which the individual belongs, but soon he plays his rôle on a larger social stage, first as member of the school community, and later as an adult member of the general community, with complex relations to a great variety of social groups, occupational, recreational, cultural, religious.

A large part of man's waking time is passed in work. Many of his satisfactions and his frustrations are associated with his work; his beliefs, his customs, his code, his personal relations are conditioned by his work. In his study and treatment of the individual patient the psychiatrist has to study not only the fundamental biological components of the personality and the complicated balance of factors within the family circle, he has to weigh the satisfactions and frustrations in the wider social relations, among others the satisfactions which come from work. One studies the extent to which the work program is an adequate outlet for the special endowment of the patient and scrutinizes the factors involved in the personal relations included in the working environment. Here too, as within man's personal kingdom and within the castle of the home, so in the factory and on the farm, in the store and in the office, on the bench, in the pulpit, in the hospital ward and the editorial sanctum there is rivalry and conflict, with the issue of peace or war never finally settled. Man craves a certain status or prestige or self-respect, he suffers from a feeling of inferiority. He craves a certain degree of independence; he is not content to be a pawn or tool or material for exploitation. He craves the opportunity to exercise skill or power, to express himself according to the nature of his endowment. The satisfactions and activity in the workshop may balance personal and domestic dissatisfactions and tensions; on the other hand, personal and domestic difficulties may be carried over into the factory with disturbing effect. In his patients the psychiatrist may see the importance of lack of status, of a feeling of inferiority, of frustration of self-expression, of dehumanized personal relations, boredom, envy, depressive preoccupations. When these responses of the individual are subject to the astounding amplification observed in group phenomena, a community is divided against itself, labor unrest and class war take the place of friendly social cooperation. For the solution of these problems or for the amelioration of the situation a clear grasp of the human factors is essential. The less personal problems involved in production and distribution are complicated, but the psychology of the men and women involved is of equal importance. Beneath quiescent industrial situations mighty forces are often slumbering, latent discontents are accumulating, tensions increasing. It may need only a small spark, a propitious occasion, a specific point of

crystallisation, a dynamic personality, to demonstrate how unsound was the apparent equilibrium, how tenuous the social bonds, how divergent the individual interests.

The organization of an industrial society presents many difficult technical problems, but the most important general consideration is that of giving reasonable opportunities for the satisfaction of the human needs of the individuals who compose the society.

For that to be done one needs to know something of the needs of the human individual, as well as something of the resources of the community. When the social organization shows symptoms of disorder, emphasis might well be laid on studying the basal conditions underlying the symptoms rather than on directly attacking the symptoms. The number of patients admitted to mental hospitals with alcoholic psychoses is very great; the number of individuals in whose unpleasing lives chronic alcoholism plays a glaring rôle is considerable; society allows children to be brought up in sordid alcoholic homes, in an atmosphere seriously detrimental to their actual happiness and future welfare. A direct attack has been made on this symptom of social disorder by administrative efforts to eliminate or reduce the consumption of alcohol. The fundamental disorder is not touched by the treatment of the symptom. The underlying disorder is in the tensions and dissatisfactions of the individual life. These latter we must study in painstaking detail; then we can consider how help may be brought to individuals in need of help and how society can organize conditions of life which may reduce undue stresses and offer reasonable opportunities for satisfaction. No easy task; for it may involve problems of housing, wages, educational opportunities juvenile and adult of various types, opportunities for recreation, for the exercise of skill, and for the enjoyment of art.

The problem of prostitution and of venereal disease is not altogether one of bacteriology and of administrative measures. Segregation and prophylaxis may have their place. Human values are also involved; what steps can society take so that each individual shall have due respect for the destiny of his fellow being, sufficient appreciation of the values of modern culture to be willing to accept restrictions on self-indulgence as his contribution to the maintenance of that culture? No easy task.

Delinquency and crime are an obvious challenge to the complacency of society; purely repressive or punitive measures are recognized as inadequate, and earnest students of the subject have shown the relationship of these disorders to anomalies of human nature and to the imperfections of the social structure.

So whether one starts from mental disorder, from wayward or anti-social conduct, from industrial discord, racial and religious intolerance, mob violence, or national animosities, one is faced with the necessity of studying human nature and the various forces involved in organized group life.

Although one may have no illusion as to the immediate effect of knowledge and reason on the conduct of human affairs, one may still have faith in their irresistible if slow penetration. The physical world once seemed rather a muddle, full of unexplained and unpredictable events; man has elicited many of its secrets, and the control of the forces of nature thus gained has made man's life less "solitary, poor, nasty, brutish and short." Man's happiness, however, depends on more than material comforts, it depends on the nature and quality of human relations, on his attitude to the cosmos, on his response to spiritual values. In the muddled state of human affairs blind instinctive and unconscious forces will continue to be operative, but it is our task to see that rational considerations play an increasingly important rôle. Foremost among these considerations is sound knowledge of the component forces of human nature, and of the forces at play in group life.

The psychiatrist is daily accumulating facts with regard to human nature, its tasks, and its mode of reacting to these tasks. In the United States in a single year (1935) 101,462 patients were admitted to hospitals for mental disease for the first time. In perhaps 50,000 of these patients the disorder expressed some special vulnerability or instability, some difficulty in establishing harmony between the warring elements in the personality or in establishing sound relations with the immediate social group.

The psychiatrist had in each of these cases to search for any evidence of undermining disease, to study the native endowment, the complicated balance of forces within the personality, the moulding factors in home and school and job, the adaptation to the code of the community, the compromise between opposing loyalties, the sources of satisfaction available in the community, the continu-

ing or episodic stresses or deprivations. The investigation in each case had for its goal the restoration of the personal equilibrium, the restoration of the patient to the social group. For this purpose the physician had to learn to know his patient as we know few of our fellows. He had to put aside convention and disguise, to disregard the familiar excuses and evasions, to penetrate beneath the surface to the actual driving forces of the individual life. He had to scrutinize the situation, to evaluate its actual significance to the patient, its fitness for his needs, its supply of essential elements, its demands on the patient. He had to study the development of the disorder, the earlier phases of the adaptation of the individual, the increasing difficulty of maintaining the personal equilibrium, the culmination in the actual symptoms which signalled the need for help.

In such a study of the situation the physician takes up in detail the forces and the values which permeate the home, the workshop, and the general social atmosphere. He scrutinizes these factors from the special point of view of their bearing on the welfare of the human personality.

Such work with an individual patient takes the hospital physician, usually through an auxiliary worker, into the fulness of community life, into the home, the school, the playground, the job, the market place, the court, the church. He has thus the opportunity of evaluating how far the community supplies the necessary resources for a wholesome life, how far these resources may have been practically barred to the patient, how far social forces had frustrated or distorted the personality of the patient.

His insight into the social structure of the community from which his patients come may well be of peculiar value, focussed as it is not on the external aspects of the social structure but on its fitness as a habitat for the human spirit—if I may be allowed the use of this word.

In his efforts to return the patient to the community, as in his study of the prevention of such disorders, the physician has to evaluate the attitude of those individuals in the community, whose personality influences most directly the atmosphere which the patient must breathe. He has to evaluate the insight, the plasticity, the human quality of these people, of the family or the teachers, or again of fellow-workers, social companions, religious associates.

One does not know in how many hundreds or thousands of the patients admitted to mental hospitals in 1935 such a survey was actually made. What may be emphasized is the fact that these issues were presented by the patients, however they may have been met by the mental hospitals. The mental hospital has an unusual strategic position for accepting the challenge of these issues. The mental hospital in meeting its task of restoring the unbalanced to their normal tasks and of organizing a tolerant community for the mentally crippled has at the same time the opportunity of making a unique contribution to the study of concrete social issues, and to the education of its local community.

Many members of this Association are quietly and unpretentiously carrying on such investigations, and acting as a leaven in their community. It is important for the Association to take special cognizance of these efforts and to express its interest and appreciation.

The physician working in the wards or the out-patient department or the neighborhood clinic of the mental hospital may feel that the detailed study of men and women in their adaptation to the ordinary circumstances of the home and the market-place is considered a rather humdrum affair. Its general human interest is recognized, it may occasionally have dramatic qualities, it is a condition of professional work done at a respectable level. But from the point of view of recognition and prestige and even financial support this type of investigation is not quite on a par with that of his more favored colleagues working at problems of the basic sciences, using elaborate instruments of precision, utilizing the experimental method. The hospital physician may be sensitive to the charge that he is addicted to descriptive psychiatry.

"Descriptive" need not be a term of reproach; the value of description may depend upon what one describes, and how one describes it, upon the accuracy of the observations which form the basis of the description and the importance of the factors upon which observation is focussed. A description may have literary or artistic value, without having much scientific value; the author of such a description may have little interest in the significance of the facts described, he may show little discrimination between the essential and the unessential. The observer, however, who is keenly interested in the moving why of human behavior and thought, who

is sensitive to the main issues of human life, who describes with accurate detail and with a sense of porportion the sequence of events in the evolution of an individual life in its special setting, may make a valuable contribution to our knowledge of human nature.

The basic biological processes involved in human behavior are the object of intensive study, and some pin their hope for the elucidation of man's difficulties and for his salvation on the outcome of these studies; but the behavior itself, its organization, its relation to the forces of the social medium is also in itself a worthy subject of study, with its own problems, its own laws, its own practical importance. It is only in the broader setting of behavior that the full significance of the basic biological processes can be adequately conceived.

The great entomologist Fabre did not limit himself to detailed studies of structure or chemical reaction, or of the action of isolated systems. His detailed studies of this nature were in the setting of a passionate interest in the life of his favorite insects, his wasps, his beetles, his caterpillars and spiders. He spied and eavesdropped on them in their most intimate activities; he followed them through their daily routine, he dogged them from the cradle to the grave, carefully observing, accurately describing. He watched them at work, and at play, and in their workshop, he described their dressmaking and their meals, he observed them in their domesticity and in their broader social life. This descriptive entomology of Fabre, inspired by a profound sympathy for living creatures, is an outstanding scientific contribution.

Fortunately for Fabre his life-span was much longer than that of the objects of his loving study. With the psychiatrist the situation is different; in addition the objects of his study are more complicated, their social organization more elaborate. He can only do what the nature of his material permits, but he may perhaps carry some of the enthusiasm and the sympathy of Fabre into his own daily observations of man and his social organization. With these gifts he will all the more efficiently minister to the mind diseased, and help to diagnose the ailments of a society, socially and industrially sick. It may be good for him working industriously in his own hospital, with modest means, towards limited objectives, to see his work as an element in an extensive campaign, the spirit of

which inspires The American Psychiatric Association. All that this Association can do to help the staff members of our mental hospitals to realize their opportunity for service, to broaden their training, to improve the conditions under which they work is to be looked on as a service to the community as a whole and not merely as a service to a special professional group.

The worker in the state hospital will be all the more efficient if he knows that he has the reasoned support of the Association behind him as he carries on with his task of bringing self-knowledge to the individual and to the community and of helping each in its task of attaining inner harmony. He may even feel that he is actuated by the same ideal which inspired the Netherlands appeal. A society which has undergone a mental catharsis through the painful process of self-knowledge may be conscious of a certain stability and peace, and can establish its international relations on a frank and honest basis of good-will and cooperation, and can meet animosities and jealousies with an understanding attitude which may encourage self-knowledge on the part of others.

I am afraid that I have covered too much ground in this address, perhaps with rather erratic leaps. To jump from the statesmen of the world to the spiders of Provence may have exhausted you; universal peace and the peace of the individual soul may seem light-years apart. The needs of the individual in various walks of life, the real social forces and values in metropolis, manufacturing center, small town, farming community and sparsely settled areas could not be painted in.

It is the function of The American Psychiatric Association, through the continued and diversified work of its members and through the organization of its annual meetings to make the connection between the work of the individual psychiatrist and the progress of human culture, suggested in this paper, so clear that he who runs may read.

C. MACFIE CAMPBELL, M. A., B. Sc., M. D.

President, 1936-37.

A Biographical Sketch,

By WILLIAM L. RUSSELL.

Dr. Charles Macfie Campbell was born in Edinburgh, Scotland, on September 8, 1876, and obtained the major part of both his general and his professional education in this "Modern Athens." After a preliminary preparation in the celebrated George Watson Boys' College, he matriculated at the university in 1893. There he remained in attendance for nine years, following various courses to his ultimate goal in medicine. The summer of 1896 was spent studying in Paris, and in the following year he received from the university the degree of M. A. with first class honors in philosophy. He spent the summer of 1897 in Germany studying the language, and upon his return he entered upon the study of medicine. In 1900, he received the degree of B. Sc., with distinction in anatomy, physiology, and anthropology. The summer of 1901 found him again in France, in the clinic of Professor Raymond at the Salpêtriere.

In 1902, he was graduated in medicine with the degrees of M. B. and Ch. B. (*summa cum laude*). He was awarded the McCosh Graduates and Medical Bursaries, and, his preferences in medicine having become clear, he spent the next year in studying neurology and psychiatry; from September, 1902, to April, 1903, at the Bicêtre with Pierre Marie, and attending Babinski's Clinic, and from April to September 1903 in Nissl's laboratory at Heidelberg, and in attendance of courses by Erb, Hoffmann, Kraepelin, and von Hippel. In September he was back in Edinburgh as a resident at the Royal Infirmary, and helping Alexander N. Bruce in a study of the intermedio-lateral tract.

Dr. Campbell had been to America for a short visit in 1893, and, in 1904, the offer of a position as interne in the Pathological Institute (now Psychiatric Institute) of the New York State Hospitals, of which Dr. Adolf Meyer had recently become director, was sufficiently inviting to lead him to accept. He was soon advanced to the position of assistant physician and remained until 1907, when

he resigned to accept a corresponding position at the Royal Edinburgh Asylum (now Hospital), of which Sir Thomas S. Clouston, M. D., was director. A strong magnet that had turned him back to Scotland was revealed on June 3, 1908, when he married Jessie Deans Rankin of Glasgow, who was also a physician. It was in 1908 also that he became a member of the Royal College of Physicians of Edinburgh (M. R. C. P. Edin.).

In the same year, the lure of the wider opportunities of America was again held out to him and he returned to the institute in New York in the position of associate, and instructor in psychiatry at Cornell University Medical College. There he remained until 1911, when, pending the opening of the Phipps Psychiatric Clinic of Johns Hopkins Hospital, Baltimore, of which Dr. Meyer had been appointed director, he resigned and accepted the position of first assistant physician at Bloomingdale Hospital (now New York Hospital —Westchester Division) at White Plains, New York. In that year also he submitted to the University of Edinburgh his thesis on "Focal Symptoms in General Paralysis," based on studies he had made at the institute, and received the degree of M. D.

The following two years were spent at Bloomingdale, studying and treating patients; and making a lasting contribution to the reorganization and quickening of the service for the more active plans of work that had been adopted by the governors. Dr. Campbell's earliest contributions to medical literature were neurological. In 1908, however, he published an article on "Psychological Mechanisms with Special Reference to Wish Fulfilment," and, in 1911, one on "The Rôle of Psychoanalysis in Psychiatry." While at Bloomingdale, where the cases were nearly all functional, he paid particular attention to the psychological aspects, making special use of association tests. In 1912, he published an article on "The Application of Psychoanalysis to Insanity," and in 1914, when Volume II of the Pathological Institute "Studies in Psychiatry," was issued it contained an article of his on "The Mechanism of Some Cases of Manic Depressive Excitement."

In 1913, he joined Dr. Meyer at the Phipps Clinic in the position of associate director, and associate in psychiatry (1914, associate professor of psychiatry) of the Johns Hopkins Medical School. There he spent seven productive years, in hospital and out-patient clinical work, in scientific investigations, and in teaching and writ-

ing. During this period he published 17 articles that reveal the trend and growing breadth of his interests and efforts; the subjects being clinical, including child psychiatry and psychiatry in general medical practice. One of these articles was based on the study of the children in a Baltimore school district.

During the war, Dr. Campbell was, for a short period, a private in the U. S. Army. His principal contribution in war service was, however, as a civil surgeon, in the intensive training, at Johns Hopkins Hospital, of physicians preparing for neuropsychiatric work in the army. He also spent some time at a special army hospital at Lakewood, New Jersey, studying the heart disorders of soldiers. This study was the basis of his article on "The Rôle of Instinct, Emotion, and Personality in Disorders of the Heart" that was published in the Journal of the American Medical Association in November, 1918.

He grew steadily in professional stature and reputation so that, when, in 1920, Dr. E. E. Southard, director of the Boston Psychopathic Hospital and professor of neuropathology of Harvard Medical School, died, Dr. Campbell was appointed as director of the hospital and professor of psychiatry in the medical school. In these positions, which he still holds, his career has been one of increasing usefulness and distinction. Besides attending to the exacting duties of his position, he has given much time and effort to the advancement of psychiatry and mental hygiene in the general medical profession and in the general body of knowledge and social standards. He was, for 10 years, president of the Massachusetts Society for Mental Hygiene. He is a member of the National Committee for Mental Hygiene, and of the Advisory Committee of its Division on Psychiatric Education. He is also an honorary vice-president of the International Committee. He is a fellow or member of all the leading local and national psychiatric societies, and was president of the American Psychopathological Society in 1918, of the Boston Society of Psychiatry and Neurology in 1924, and of the Massachusetts Psychiatric Society in 1933. He has been a member of The American Psychiatric Association since 1917, and has made valuable contributions to its programs. He is also a member of the British Medical Association, a corresponding member of the Royal Medico-Psychological Association, and of the Section of Psychiatry of the Royal Society of Medicine of

Great Britain, and of the Société de Neurologie de Paris, and honorary member of the Nippon Seishin Shinkei Gakkwai (Japanese Society of Psychiatry and Neurology). He is also a member of the principal local and national general medical societies, of the Eugenics Research Association, and of the History of Science Society, a fellow of the American Academy of Arts and Sciences, and honorary fellow of the Institute of Medicine of Chicago.

In 1924, Dr. Campbell was invited to deliver the Shattuck Lecture before the Massachusetts Medical Society, and chose as his topic, "Psychiatry and the Practice of Medicine." In 1927, he delivered the Pasteur Lecture before the Chicago Institute of Medicine, in 1933, the Gehrmann Lectures at the University of Illinois Medical School, and the Lowell Lectures at the Lowell Institute, Boston, and in 1935 the Salmon Memorial Lectures at the Academy of Medicine, New York. Some of these lecture series have been published in book form under the titles: "Delusion and Belief," "Towards Mental Health," "Destiny and Disease in Mental Disorders." Dr. Campbell also contributed the chapter on "The Treatment of Dementia Præcox" in White and Jelliffe's well-known treatise, the chapter on "Mental Disorders" in Cecil's Textbook of Medicine, a chapter in the "Contributions to the Study of the Personality," published in honor of Dr. Morton Prince in 1925, a chapter in the study of the Problem of Mental Disorder made by a committee of the National Research Council, and a chapter on "Mental Hygiene and Education" in "Social Aspects of Mental Hygiene" (Yale University Press 1925). His Lowell lectures on "Human Personality and Environment" were published in 1934. His contributions to current psychiatric literature have been numerous and on various topics, with clinical studies, psychiatric education, and mental hygiene predominating. As a speaker and teacher he is impressive, interesting, and stimulating, and, in that way has contributed more to psychiatry and mental hygiene than has appeared in his publications. Few psychiatrists have, with such a sturdy mental alertness and openmindedness, maintained a more steady equilibrium amid the cross currents of modern psychiatric thought and practice than Dr. Campbell. His sound practicality, his breadth of knowledge, and his philosophic grasp, as well as his clearness of thought and expression, are well shown in his recent address as President of The American Psychiatric Association.

A NOTE ON THE URINARY PHOSPHATE OF NIGHT URINE IN MENTAL DISEASE.*

By WALTER MICHAEL BACHINSKI,
AND
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The large amount of phosphorus containing compounds in brain and nervous tissue and their universal distribution through all living cells has led to much research as to the rôle of phosphorus in animal metabolism. It is known that the compounds of phosphorus play an essential part in the metabolism of fat, carbohydrate and protein. They are also fundamental to such physiological processes as the contraction of muscle, the ossification of bone and permeability of cell membranes.

The average diet contains a great variety of phosphorus compounds, viz.: inorganic phosphates, phospholipids (lecithin and kephalin), phosphoproteins (caseinogen of milk) and the simpler organic esters, such as glycerophosphates and hexosephosphates. Since phosphorus compounds are found abundantly in nerve tissue and since they form a considerable portion of the average diet, it was thought advisable to investigate the possible relationship between mental disease and the urinary excretion of organically bound and inorganic phosphate.

Mairet (1884) in studying the phosphorus metabolism of manic-depressives found an increased total urinary phosphate excretion over normal in both the agitated and depressed states. Lailler (1884) found that in acute delirium or mania there was a marked

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Our thanks are due to Dr. T. A. Pincock, Medical Superintendent of the Brandon Hospital for Mental Diseases, for permission to procure the urine samples, for use of the library and access to the files of that institution. To Dr. Creasy and Dr. Little, from the same institution, our thanks are also due for advice and criticism in preparing this article.

We wish to express our thanks to the Banting Research Foundation for a grant to one of us to defray the cost of apparatus and chemicals.

excess of phosphorus in the urine, in hypomania a slight excess only, while in mild depression the urine was normal. After making a careful study of the urines of insane patients and numerous controls, Folin, Shaffer and Hill (1904) concluded that there was insufficient experimental data recorded in the literature to warrant any connection between the urinary phosphate excretion and mental disorder.

In studying the excretion of phosphoric acid in urine in the psychoses, Tsuchiya (1924) found in neurasthenics an average excretion 2.4 times the normal. In eighteen manic-depressive cases there was an average increase of twice the normal, both in excited and depressed states. The examination of five epileptic specimens before and shortly after an attack gave low values preceding and high values shortly after the fit, with an average about twice the normal. In dementia præcox the values were close to the normal, while in excited catatonics the average was about twice normal.

More recent work by Weil and Liebert (1937) on the phosphorus content of the blood serum during an epileptic seizure in man has shown that during the seizure the inorganic phosphate content of the serum was increased by 34 per cent. Analyses of the blood serum were made during the aura preceding the convulsion, during the attack itself, and after the seizure. Experimental injection of rabbits with an emulsion of thujone produced convulsive seizures and an accompanying increase in the inorganic and organic phosphates of 98 and 37 per cent respectively. Upon administering curare into the muscles, further injections of thujone did not affect the phosphate content. Their final conclusion was that in man the tonic-clonic contractions of the muscles during an epileptic fit are the source of the increased serum phosphate.

In view of the indefinite results reported by various workers in literature regarding the urinary excretion of phosphate in the psychoses it was thought advisable to investigate the matter more fully using improved methods of analysis and noting at the same time any abnormal physical or pathological condition of the patient in addition to his true mental type. It was further noticed that many of the previous workers were quite ambiguous in their use of nomenclature for the various mental types examined, and in view of recent advances in experimental psychiatry much more care has to be given to this phase of the problem.

Experimental Work.

The inorganic phosphate present in the urine was estimated using King's (1932) method. Rae's (1936) modification of Youngburg and Pucher's (1924) method for the determination of organic phosphate was followed with satisfactory results. All samples of urine were collected in the morning between 5 and 7 a. m. and represent the night urine.

(a) *Inorganic Phosphate.*—To 0.2 cc. of the urine in a 25 cc. volumetric flask distilled water was added up to 10 cc. 2 cc. of 60 per cent perchloric acid, 1 cc. of 8.33 per cent ammonium molybdate and 1 cc. of 0.33 per cent amino-naphthol-sulfonic reagent were added, and water up to 25 cc. A standard containing an appropriate amount of phosphate was prepared in the same way at the same time. The contents of the flasks were shaken and after five minutes the colors were compared, using a Duboscq colorimeter.

(b) *Organic Phosphate.*—The feasibility of this method depends upon the complete precipitation of the inorganic phosphate. To do this 10 cc. of the urine was treated with a calculated excess of magnesia mixture (magnesium chloride, ammonium chloride solution) without added ammonia (0.16 cc. magnesia mixture for each mg. of inorganic phosphate present), and an equal volume of normal ammonium hydroxide. The mixture was well shaken and allowed to stand for ten minutes (pH 8.8-9.0). After filtering, 3 cc. of the filtrate was used for the organic phosphate analysis. The filtrate was tested for the complete precipitation of inorganic phosphate by method (a) above. 2 cc. of 60 per cent perchloric acid was then added to the organic phosphate sample, and the mixture digested on an electric heater. A drop or two of nitric acid was added to hasten the oxidation of organic matter. The contents of the tube were then cooled and transferred with washing into a 25 cc. volumetric flask. 0.2 cc. of perchloric acid was added to make up for loss of acid by evaporation. The procedure from then on was the same as the inorganic phosphate analysis. The results obtained are given in Table I. (All the patients were males.)

Conclusions.

1. The normal urinary phosphate excretion as determined by Rae (1936) was inorganic phosphate 102 mg./100 cc. and organic

TABLE I.

File.	Mental classification.	Age.	Urinary phosphate mg/100 cc.			Remarks.
			Inorganic.	Organic.	O.P./I.P.	
	SCHIZOPHRENIA.				*Per cent.*	
1	Paranoid	33	116.9	1.51	1.29	Good condition.
2	"	26	65.2	0.86	1.32	Good condition.
3	"	59	60.9	1.37	2.24	Moderate sclerosis.
4	"	56	44.38	0.89	2.01	
5	"	59	57.33	0.90	1.57	Good condition.
8	"	32	143.9	1.28	0.89	Albumin very heavy.
9	"	52	99.34	1.17	1.18	Good condition.
12	"	23	26.37	1.22	4.63	Good condition.
25	"	51	96.50	1.0	1.03	Good condition.
27	"	38	92.02	0.95	1.03	Some sclerosis.
6	Catatonic	36	104.7	2.23	2.13	Septic tonsils.
7	"	21	243.0	2.78	1.14	Acute excitement.
10	"	24	61.62	0.96	1.56	Good condition.
29	"	60	70.0	2.35	3.35	
11	Simple	20	76.05	0.84	1.10	Good condition.
13	"	32	88.24	1.88	2.13	Good condition.
14	"	21	88.3	1.26	1.43	
31	Hebephrenic	36	115.4	1.44	1.24	
	MANIC-DEPRESSIVE.					
15	Depressed state	35	65.37	0.85	1.30	
16	" "	58	25.62	1.46	5.69	Moderate sclerosis.
17	" "	50	50.33	0.61	1.21	Asthenic type.
18	" "	58	20.83	1.12	5.38	
20	" "	62	20.12	0.88	4.37	Peripheral sclerosis.
21	" "	59	69.16	0.88	1.27	Marked sclerosis.
23	" "	49	53.05	1.70	3.20	Malformation of chest.
52	" "	45	47.02	1.08	2.29	Arteriosclerosis.
19	Manic state	57	110.5	0.86	0.77	Good condition.
22	" "	65	99.33	1.08	1.09	Peripheral sclerosis.
24	" "	45	115.0	0.58	0.50	Good condition.
	GENERAL PARALYSIS OF INSANE.					
43	G. P. I.	28	88.33	1.11	1.33	Good condition.
44	"	51	76.75	0.66	0.86	Good condition.
45	"	49	106.3	0.78	0.73	Slight arterio-sclerosis.
46	"	25	46.88	0.74	1.58	Good condition.
47	"	43	98.05	1.60	1.63	Good condition.

TABLE I.—CONTINUED.

File.	Mental classification.	Age.	Urinary phosphate mg/100 cc.			Remarks.
			Inorganic.	Organic.	O.P./I.P.	
	SENILES.				*Per cent.*	
26	Paranoid.....	54	132.40	3.01	2.27	Arteriosclerosis.
28	"	60	49.7	1.46	2.94	Good condition.
38	"	80	35.0	1.25	3.57	
33	Psychoses with cerebral arterio-sclerosis.....	80	91.46	0.70	0.76	Extreme restlessness.
34	"	68	84.29	0.64	0.76	Sclerosis restlessness.
36	"	76	18.86	0.78	4.13	Peripheral sclerosis.
37	"	79	48.33	0.62	1.28	Arteriosclerosis.
39	"	90	53.03	1.32	2.48	Enlarged heart.
40	"	62	41.0	1.61	3.92	Peripheral sclerosis.
41	"	70	41.09	1.34	3.26	
30	Senile psychoses...	70	33.7	1.65	4.90	
35	" " ...	75	42.86	0.69	1.61	
32	Organic brain disease.....	49	55.16	1.12	2.03	Moderate sclerosis.
	OTHER PSYCHOSES.					
48	Organic brain disease.....	56	76.33	1.08	1.41	
56	Psychosis with brain disease....	61	89.28	1.43	1.60	
57	Psychosis with Huntington's chorea.....	44	78.53	2.12	2.69	
50	M.D. without psychoses.....	15	89.28	1.14	1.28	
53	M.D. with psychoses.....	40	149.5	0.63	0.42	
58	M.D. with psychoses.....	20	125.0	1.30	1.04	
42	No psychosis. Morphine addict.	39	134.2	1.03	0.76	
51	Homocidal. Suicidal.....	39	59.06	0.85	1.44	Depressed state.
49	Undiagnosed.....	38	63.60	1.05	1.65	Organic brain lesion(?).
54	Psychoneurosis....	28	87.06	1.30	1.49	
55	Psychopathic inferiority.....	35	85.71	1.18	1.38	

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phosphate 1.20 mg./100 cc., using 24 hour samples. It must be remembered that the urines obtained were overnight samples and that comparison with normal 24 hour samples is of rather doubtful significance. Since it was impossible to collect 24 hour samples due to incontinence and the types of patients studied, the results are significant only when compared with each other. The facts that night urines only were used (thus eliminating the active exercise factor), the patients were all on the same diet, and the samples were all collected within a few weeks, would tend to lend significance to these results. The average values for the group examined (58 patients) were 78 mg./100 cc. of inorganic phosphate; 1.20 mg./100 cc. of organic phosphate and 1.78 for the O.P./I.P. ratio.

2. In the schizophrenics the values obtained were so diverse as to make an average value almost meaningless. However, patients in the catatonic state seem to exhibit slightly higher values than those in the paranoid state.

3. In the manic-depressives the average values for the depressed state were: I.P. 43.9; O.P. 1.07; O.P./I.P. 3.09, and for the manic state I.P. 108; O.P. 0.84; O.P./I.P. 0.79. These results differ from those obtained by some former workers who claim an increased urinary phosphate excretion in both the manic and depressed states of the psychosis, in showing a decrease in the depressed state with increased excretion in the manic state.

4. In the senile group there is also a lowering of the inorganic phosphate.

5. In the other psychoses tabulated and in the general paralysis of the insane group there are no marked deviations from the average values.

6. Although it was hoped in this research to find some connection between a specific mental disease and phosphorus excretion, the results indicate that only in those psychoses in which there is a marked difference in muscular activity is there any change in the urinary phosphates. The authors would also like to point out that due to the rather large differences in the individual values obtained previous work of this nature done only on a few patients is inclined to be of limited significance.

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THE EFFECT OF BENZEDRINE SULPHATE ON CERTAIN ABNORMAL MENTAL STATES.*

By PURCELL G. SCHUBE, M. D., M. C. McMANAMY, M. D., C. E. TRAPP, M. D., AND A. MYERSON, M. D.

Recently Peoples and Guttmann [1] reported a study on the effects of benzedrine on man. In this study they noted that benzedrine had certain psychological effects, *i. e.,* that it produced an increased tendency to talk, especially in depressed persons, some motor restlessness, and a change in mood in the direction of euphoria. Prior to the publication of the above paper Myerson had noted that frequently he obtained in normal individuals, in mildly depressed and in psychoneurotic persons, and in normally fatigued persons, certain distinctly beneficial results following the administration of benzedrine. An oral dose of 10 to 20 mg. of benzedrine would produce a warm glow of the body which was quite agreeable and which was associated with a sense of relaxation, and at the same time a disappearance of the drowsy, tired feeling around the face and eyes. There was established a sense of calm which was quite gratifying and pleasing, a lessening of any distress or depression, and an increasing feeling of the possession of energy to be used up, a desire to do things. It appeared that in these individuals benzedrine had permitted the replacement of a group of undesirable symptoms by a group of highly desirable ones; that in persons, normal and mildly abnormal, benzedrine was definitely beneficial because it permitted the existence of a physical or mental state which was conducive to a more adequate and satisfactory social adjustment. In a recent paper Myerson [2] has incorporated this material and has included case reports showing that the depressed, restless, agitated, and fearful states, feelings of unworthiness, feelings of inferiority and fatigue, in individuals with anhedonic neuroses or minor stages of the psychoses of the same general type, were relieved of these symptoms to a great extent as

* From the Psychiatric Clinic and the Research Laboratory of the Boston State Hospital, Boston, Mass. Aided by grants from the Commonwealth of Massachusetts and the Rockefeller Foundation.

long as the use of the benzedrine was continued, but that they reappeared upon its discontinuance.

At the time that Myerson was making this study, we began to investigate the effect of benzedrine on those individuals who possessed major psychoses and who were sufficiently psychotic to necessitate hospital treatment. It is the purpose of this paper to report our findings.

METHOD.

The persons used in this study were routine admissions to the Psychiatric Clinic of the Boston State Hospital. They were free of any demonstrable organic pathology. Both male and female patients were used. They were divided into three groups. Group 1 received benzedrine sulphate in daily single doses of 10 mg. by mouth for 30 days. Group 2 received 10 mg. of benzedrine sulphate in 2 mg. doses by mouth every two hours for five doses daily for 30 days. Group 3 received 10 mg. of benzedrine sulphate in one single subcutaneous injection daily for 30 days. There was also a small fourth group which received 30 mg. of benzedrine sulphate subcutaneously daily for 14 days. In the periods before, during and after the benzedrine sulphate administration the mental and physical state of the individual patient was studied.

In the entire series there were 80 patients. In Group 1 there were 25 patients: 10 dementia præcox, 12 manic-depressive, depressed, and 3 psychoneuroses, neurasthenic; 15 males and 10 females. The age range was 20 to 48 years. In Group 2 there were 25 patients: 8 dementia præcox, 15 manic-depressive, depressed, and 2 psychoneuroses, neurasthenic; 13 males and 12 females. The age range was 18 to 55 years. In Group 3 there were 25 patients: 15 dementia præcox, and 10 manic-depressive, depressed; all males. The age range was 17 to 50 years. In the fourth group there were 5 patients, all dementia præcox; all males. The age range was 22 to 35 years.

RESULTS.

Group 1.—In this group there was no improvement; five patients (4 females, 1 male) became worse, and in four of these patients (3 females, 1 male) the drug had to be discontinued because of the severity of the reaction of the patient to the drug.

Group 2.—In this group there was no improvement; seven patients (4 females, 3 males) became definitely worse, and in three of these patients (2 females, 1 male) the drug had to be discontinued because of the severity of the reaction.

Group 3.—In this group there was no improvement, and two patients, both females, became worse necessitating discontinuance of the drug.

Group 4.—In this group there was no improvement and one patient, a male, became progressively worse under treatment so that the drug had to be discontinued at the close of nine days. This individual died some months later of bronchopneumonia, and although it is possible that the benzedrine might have contributed to his death, since all of the other individuals used in the study are at the present alive and healthy, this is highly improbable.

Thus, of the 80 patients treated with benzedrine sulphate none improved, 14 became definitely mentally worse as long as the treatment was continued, and one continued worse after the treatment was discontinued until his death some months later. Of those patients who reacted badly to the administration of the drug 10 were manic-depressive, depressed (7 females, 3 males), 2 were psychoneuroses, neurasthenic (2 males), and 3 were dementia præcox (3 males).

In addition to the above findings relative to the effect of the drug upon the abnormal mental state several other observations of a physiological nature were made.

Thus, in 10 cases the use of the drug had to be discontinued because of the nausea and vomiting which followed its oral ingestion.

In two patients there were attacks which appeared to be cardiac following the administration of the drug.

In two patients there followed a period of definite drowsiness and subsequent profound sleep from which the individuals could be roused, but upon arousal complained of great fatigue.

In five patients there was a very definite loss of appetite and subsequent loss of weight during the course of the drug administration.

In nine cases administration of the drug produced definite constipation.

In three cases vertigo and pains in the head were complained of.

In those cases which became mentally worse under treatment there was an increase in the physical activity ranging from nervousness and finger-nail biting to pacing, fighting, shouting, screaming, and in one case board-like rigidity. In one individual there resulted a definite persistent suicidal drive. The increase in emotional activity in these cases ranged from a simple accentuation of depression to apprehension, fear, fright, marked desire to die, feelings of punishment, hatred and a marked increase in paranoid delusions. The somatic sensations complained of were headache, vertigo, dry mouth, shortness of breath, precordial pain, "pounding heart," "lead-like" heart, etc., emptiness of stomach, "all-gone" feeling in abdomen, and constipation.

Brief protocols of a few cases are presented below.

PROTOCOLS.

CASE 1.—A young woman, aged 27 years, was having her first attack of depression which was reactive and agitated in type. Physically she was somewhat restless; she paced back and forth and could not sleep. Mentally she was depressed, confused and disoriented. On May 7 she was started on benzedrine sulphate, 10 mg., by mouth, in single daily doses. On May 9 she refused to eat, became more restless and agitated, and refused to remain in bed at night. On May 11 it was necessary to tube-feed her. She was noisy and very disturbing to the entire ward both during the day and at night. She continued progressively worse until May 23 when she began to rush about, was extremely excited, tense, agitated, and apprehensive. She would repeatedly clutch her heart and shout, "I did it, I did it; God hates me; I made a terrible mistake" and "I am responsible for all evil." The drug was discontinued and within 48 hours she had reverted approximately to her original mental state.

CASE 2.—A young man, aged 35 years, was diagnosed as a psychoneurosis, neurasthenic type. Physically he was quiet and cooperative. Mentally he was somewhat depressed due to his many somatic complaints of which he had never under any circumstances been relieved. On May 28 he was started on benzedrine sulphate, 10 mg., daily, in single doses, by mouth. On June 3 he began to complain more vigorously of his heart, saying that it felt "dead." On June 7 he said he felt as if his stomach were bloated and he knew that it was much worse than before. On June 9 he complained that, strain as he would, he had no bowel movement. On June 10 he began to get drowsy about one hour after he had taken the benzedrine. By June 12 he was sleeping soundly all morning and when awakened he would complain of great fatigue and tiredness and that he could not stay awake. On June 15 he was obviously becoming nervous and stated that he felt "shaky inside." He was greatly

concerned about these new symptoms, all of which were alien to his original state. The drug was discontinued and in five days he had reverted to his original neurasthenic condition.

CASE 3.—A young man, aged 25 years, was having his second attack of depression. Physically he was slowed up and occasionally had periods of complete immobility. Mentally he was depressed, confused, apprehensive and afraid. On March 2 he was given benzedrine sulphate, 30 mg., in daily single subcutaneous doses. He showed no change for three days. On March 5 he appeared more frightened, more slowed up physically and would not talk. On March 7 he was definitely afraid, his eyes were staring, and he was physically immobile and mute. By March 10 he was entirely rigid, his eyes were wide and staring and it was necessary to tube-feed him. The drug was discontinued but his physical and mental condition continued unchanged. He lost weight regardless of the tube-feedings and had to be kept in bed where, in spite of care, he developed bed sores. This state continued. He became progressively worse physically and after about five months he developed a bronchopneumonia and died. There was no autopsy permitted.

CASE 4.—A young man of 37 in his first attack of depression. Physically he was quiet and prone to move as little as possible. Mentally he was depressed and withdrawn from group activities. On April 15 he was started on benzedrine sulphate, 10 mg., by mouth in single daily doses. On April 17 his appetite, which had always been good, began to fail. On April 18 he began to get nervous and to bite his finger-nails. On April 20 he had isolated himself entirely from others and stared into space for long periods. On April 22 he complained of a general feeling of discomfort and uneasiness, was somewhat confused and could not eat at all. He began to loss weight. On April 24 the drug was discontinued. On April 29 he was eating again and had reverted to his original mental state.

CASE 5.—A woman of 42 in her first attack of depression. Physically she was slowed up and retarded. Mentally she was depressed and unhappy. On May 29 she was started on benzedrine sulphate in 2 mg. doses every 2 hours for 5 doses, by mouth. On May 31 she became definitely more depressed and listless and it was necessary to spoon-feed her. On June 1, she at first became confused and then stuporous and had to be dressed and undressed. On June 2 she was mute and rigid. Her respirations were rapid and shallow and came in gasps. Her pulse was rapid and scarcely palpable. Her heart sounds were snapping in quality. She appeared very sick and frightened. The drug was discontinued and on June 4 she had reverted to her original mental state. When questioned about the episode of June 2 she said she had had precordial pain, was apprehensive and afraid and thought that she was going to die.

CASE 6.—A young man of 23 was diagnosed as a case of dementia præcox. Physically he was normal. Mentally he possessed a bizarre set of badly organized delusions with abnormal affect. He had always been cheerful and

cooperative. On February 15 he was started on benzedrine sulphate, 10 mg., by mouth in daily single doses. On February 19 he became irritable and restless. On February 20 he was so disturbed he had to be restrained. While in restraint he was extremely excited and tore at his restraint. On April 21 he became so violent that he broke his restraint and made a definite suicidal attempt. He stated that he was determined to kill himself and would do so at the first opportunity. It was necessary to watch him closely all of the time because it was so obvious that he meant what he said. The drug was discontinued on April 23 and within 24 hours he had reverted to his original mental state with a loss of desire to die.

SUMMARY.

1. A study of the effects of benzedrine on certain major psychoses is presented, thus corroborating a previous report by Myerson.[2]

2. There was no improvement in any case.

3. In 15 of the 80 cases studied there was temporary accentuation of the psychosis.

4. Benzedrine sulphate was of no value in the alleviation of the psychoses in the cases studied.

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DEFINITION OF CHILDHOOD IN PSYCHIATRIC LITERATURE.*

By CHARLES BRADLEY, M. D., East Providence, R. I.

It has for some time been a matter of comment that the exact ages covered by the psychiatrist's concept of "childhood" have been far from standardized. The confusion in this matter was recently called to our attention during a review of the literature on schizophrenia in children.[1] In this literature many "children" are reported whose ages range anywhere from infancy to 18 or 20 years.

Without wishing to detract in the slightest from the value of any report or to criticize any of the authors' concepts, we might quote from the literature some rather typical examples of the confusion as to what properly constitutes a child. In one excellent report entitled "Ten Problem Children who later became Psychotic" Mooney and Witmer[2] included five patients who were over 15 years of age and three more who were 13 and 14 years. In another valuable contribution to the study of functional psychoses in childhood Kasanin and Kaufman[3] selected for their study all individuals under 16 years of age admitted to the Boston Psychopathic Hospital over a certain period of time. In a detailed discussion of 25 of their patients whom they considered as children only one was 12 years of age and the remainder 13, 14 and 15. Mental hospital records seem to be a frequent source of data in studies of this sort, and it seems quite customary to consider as children all patients under the age of 15 or 16 years. Potter[4] in a fairly recent review of the literature on schizophrenia in children notes: "it was found that the term 'children' was used rather loosely and included patients with ages as high as 16 and 17 years."

There would seem to be little question that most physicians consider childhood the period of life up to the time of puberty. This

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From the Emma Pendleton Bradley Home.

commonly accepted view is entirely substantiated by technical definitions of the term. Such a standard definition appears in a recent edition of the Concise Oxford Dictionary where childhood is defined as "child state; from birth to puberty." [5] The Encyclopedia Britannica, while not specifically defining childhood, mentions adolescence as "the term now commonly adopted for the period between childhood and maturity." [6]

The pediatrician, a specialist whose practice is primarily limited by the age of his patients, customarily deals with children up to the age of adolescence. Moreover, the conventional upper age limit for most pediatric hospital services coincides with the common age of onset of puberty, namely 12, 13, or at most and infrequently, 14 years. The implication, quite apparently, is that adolescence introduces new medical problems, many of them distinct from those appearing in childhood.

In psychiatric work emphasis is naturally not so much upon the age of the patient under consideration as his mental characteristics. Therefore, in standard text books we find a little different concept of the period of childhood from that which has just been mentioned. Kanner [7] states childhood "includes all the ages between the neonatal period and the termination of puberty." Stevenson and Smith [8] in reviewing the common practices of child guidance clinics note that most of the patients come for study between their fifth and fifteenth year. Certain other psychiatric institutions dealing with children are governed by a correspondingly wide concept of the period of childhood as including individuals up to 16 and 17 years of age.[9-10] However, Potter [11] states that at the New York State Psychiatric Institute experience shows that it is practical to include in a children's unit only those patients up to the time of puberty or about 14 years of age.

The psychoanalytic worker has perhaps a more definite idea of childhood which, however, for him includes an even wider range of ages. Anna Freud [12] states: "psychoanalysis distinguishes three different periods in the life of a child: early life up to about the age of the fifth year; the latency period to the beginning of the prepuberty stage about the 11th, 12th, or 13th year; and puberty which leads into adult life."

It must not be concluded that these random observations have been cited in an attempt to suggest under the guise of authority

what cases may properly be included in any particular clinical approach or bit of research. The variability of available reports, however, strongly suggests the need of some commonly accepted definition being used so that workers may have a mutual understanding of what is meant by childhood. For the psychiatrist as well as the pediatrician adolescence has its own special probems. Our understanding of these problems would be clearer if they were considered separately and not discussed as phenomena of childhood.

Adolescence is, of course, a period ushered in by increased activity of the endocrine glands, particularly the gonads, and characterized by the first appearances of sexual maturity. So far, however, we have no way of recording precisely the exact onset of this activity so that any attempt to limit "childhood" on a strictly physiological basis would probably result in even more confusion than now exists.

Any single criterion of the term "childhood" must, if it is to be readily and widely accepted, have the virtues of simplicity and clarity. An example which we may well follow in this regard is that of the pediatrician and the children's hospital to whom for classification purposes at least the "child" is an individual below a definite age level. This age level had best be that which most nearly coincides with the onset of physiological puberty and both tradition and experience suggest the thirteenth birthday.

We would, therefore, urge, for the purpose of psychiatric discussion wherein mental disorder is specifically considered because of its relation to childhood, that only individuals of 12 years and under be described as children. This practice should successfully eliminate the present confusion existing in psychiatric research and in the literature.

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SIX YEARS EXPERIENCE WITH NARCOSIS THERAPY IN PSYCHIATRY.*

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In January 1930 at the Pennsylvania Hospital a study of prolonged narcosis as therapy in the psychoses was begun. Twenty-six patients were treated and the results, as well as the follow-up, are expressed in Table I.

There is no question but that prolonged narcosis does something fundamental to the psychotic structure. Frequently, the disruption of the psychotic mechanisms is sufficient to allow the patient to make a permanently better adjustment or a complete recovery (81 per cent of the original series improved or recovered).[1] The following brief abstracts will illustrate the degree of interference with the psychoses.

CASE 72.—Female, age 43. Diagnosis: manic-depressive, depressed. Three previous periods of depression averaging about six months in length. Three years ago at age 40 the patient developed a severe depression which continued unchanged for the entire three year period. Psychosis was marked by negativism, mutism and periods of stupor. Treatment was begun in January 1930 and during the first intravenous injection of sodium amytal the mutism which had existed for nine months disappeared and during the semi-somnolent stages the patient talked freely and inquired into the nature of the treatment and remained cooperative throughout 10 days of narcosis. On emerging from treatment, she was for a brief time euphoric and over optimistic but improved gradually to a state of complete recovery and was discharged. She has remained well since the treatment.

CASE 5.—Male, age 24. Diagnosis: catatonic schizophrenia. Heredity badly tainted with mental disease. Patient was an only child, delicate, quiet, did not mix well and was over studious. During adolescence was not sociable, lacked humor but was able to finish professional collegiate training. During

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the first year of his professional training he became more withdrawn, seclusive, and gradually developed a threatening, suspicious attitude and became psychotic. He was resistive, destructive, irritable, had the delusion that he was God, that his parents were not his own. In the hospital he was nude,

TABLE I.

	Manic-depressive.	Schizophrenia.	Unclassified or mixed manic-schizoids.	Psychoneurosis.	Total.	Per cent.	Follow-up (6 years later).
Recovered...	6	2	1	1	10	38.5	1 manic had 2 recurrences. 1 manic had 1 recurrence. 1 schizophrenic had 1 recurrence—ill ever since.
Permanently improved..	2	1	1	0	4	15.4	2 manics and 1 manic-schizoid recovered completely. 1 catatonic remained well for 3 years, then admitted to state hospital.
Temporarily improved..	1	5	1	0	7	26.8	1 manic-schizoid socially recovered and lived at home 4 years after treatment.
Unchanged...	3	1	1	0	5	19.3	2 subsequently recovered and remained well for 4 and 6 years respectively after treatment. 2 (1 agitated depression) subsequently died.
Total....	12	9	4	1	26	100	

untidy and there were outbursts of impulsive violence and aggressiveness. He was given the sodium amytal narcosis treatment and during the semi-somnolent states he was mentally lucid and cooperative. During the week following the treatment, he discussed his professional interests, talked with several of his associates, showed complete insight and two weeks after the comple-

tion of the treatment he was discharged. He spent three months vacationing at the seashore and then returned to his professional duties and is now (seven years later) doing well in his social and professional relationships.

CASE 87.—Female, age 43. Diagnosis: severe compulsion neurosis. Patient had been ill for 18 years, her life became gradually constricted to a point where she was definitely asocial. There have been periods of acute anxiety and panic and for a year the patient was unable to accept psychiatric treatment She was given the narcosis treatment in March 1937 in an effort to break up the progessively destructive trend. She emerged from the treatment euphoric, had good insight, and was able to break through the powerful resistance which she had shown before the treatment and was able to reveal the basis for her compulsive thoughts. There was a return of some of the compulsive ideas but the patient had insight, was more accessible to psychotherapy and with help has broken through many of the restrictions imposed by her condition. Her psychiatrist believes that the prognosis has been definitely changed in a favorable manner by the treatment.

We wish to report at this time the results of 100 cases selected from a somewhat greater number of patients receiving large doses of sodium amytal or other sedative preparations and various modifications of the narcosis treatment. The 100 cases received the more or less standardized "prolonged narcosis therapy" as later described in a discussion of technique. The cases are divided as shown in Table II.

TABLE II.

Manic Depressive:		
Manics	32	
Depressions	6	46
Agitated Depressions	8	
Schizophrenia:		
Catatonics	13	
Hebephrenics	13	
Paranoids	6	46
Simple Types	2	
Mixed "Manic-Schizoid" Reactions	12	
Involutional Melancholia:		3
Psychoneuroses:		
Psychasthenias	3	5
Hysterias	2	
Total		100

LITERATURE.

The induction of anesthesia or of deeply somnolent states in an effort to dislodge psychotic mechanisms is a relatively ancient procedure in psychiatry. The first report in modern times is that of Greisinger,[2] who, in 1882, described a number of recoveries and many remarkable improvements, in psychotic states, following deep sleep induced by various anesthetics and narcotic substances. There is evidence to show that at that time the treatment was known to medicine for 50 years or more. In 1900 Rigg [3] and McLeod [4] reported the results of massive doses of bromides in cases of acute mania. Trional was used in 1901 by Wolff [5] with no particularly dramatic results. Klaesi [6] was the first to report a well standardized narcosis therapy and in 1922 he reported favorably on the treatment of a fairly large number of cases. He described the mental catharsis which has been mentioned in his subsequent papers on the subject following the administration of somnifene. He urged the use of psychotherapy during the induction phase. The results obtained by Oberholtzer [7] and others are summarized in the Table III.

In this country Bleckwenn [8] obtained encouraging results in the treatment of neuro-psychiatric conditions by the use of sodium amytal. His work has been the basis for many therapeutic endeavors with various modifications of narcosis treatment. Merloo [9] stressed the value of the treatment in revealing factors in psychopathology. He believes that narcosis treatment is a constructive therapeutic force and should be employed widely. Magnus,[10] in 1934, reported his results with dial and felt that the treatment is of great value. MacNiven,[11] Hennelly,[12] Strom-Olsen and MacCowan [13] use insulin and glucose before, during and after the treatment and believe that it is essential in combating the ketosis which accompanies the somnifene narcosis. Their results are summarized in Table III. Lorenz, Reese and Washburne [14] reported in 1934 their observations during intravenous injection of sodium amytal in 350 cases. They believe that sodium amytal, properly prepared and properly administered, produces no alarming physiological effects. Horsley,[15] in 1936, used the term "narco-analysis" in describing a combination of narcosis treatment with psychotherapy. He believes that light narcosis with intensive psychotherapy is a quicker and more effective therapeutic procedure than psycho-

Author.	Method.	Total No. of cases.	Types.	Recovered.	Improved permanently and temporarily.	No change.	Deaths.
Oberholtzer[7]	Somnifene and luminal.	92	Manic	15	7	2	4	..
			Depressed	8	0	2	2	..
			"Acute schizoid"	20	1	7	9	..
			"Somewhat demented schizoids"	10	1	4	3	..
			Catatonic	15	3	6	5	..
			"Chronic agitated cases"	19	0	8	10	..
			Paranoid	5	0	2	2	..
Lutz[38]	Dial and luminal (intravenous).	82	Schizophrenics (undifferentiated)		9	57	15	2
Moser[39]	Somnifene.	26	Schizophrenics (undifferentiated)		... 36.8%	12 29.3%	11 33.8%	3
Hennely[12]	Somnifene, glucose and insulin.	133	Manic	55	41.9	32.7	23.6	..
		..	Depressed	65	32.3	27.7	40.0	..
		..	Involutional	9	44.4	11.2	44.4	..
			Benign stupor	5	20.0	40.0	20.0	..
Broder[17]	Sodium amytal.	58			27.8%	46.4%	25.8%	..
Mac Niven[12]	Somnifene.	40	Manic-depressed		11% (5)	64% (25)	25% (10)	1
Monnier[34]	Cloetta.	160	Schizophrenics.		53	47	58	2
Favre[35]	Somnifene, dial and cloetta.	16	Schizophrenics.		5	8	3	..
Strom-Olsen and Mac Cowan[13]	Somnifene, insulin and glucose.	107	Schizophrenics	49	8.1%	38.7%	53.2%	..
		..	Manic-depressed	45	37.7%	29.0%	33.3%	..
		..	Neuroses	13	61.5%	15.4%	23.1%	..
Nakamato[36]	Sulfonal.	149	Schizophrenics.		11%	19%	48%	1%
Serejeski[37] and Feldman	Cloetta, glucose and insulin.	28	Schizophrenics and compulsion neuroses.		5	Uncertain as to improvement except in 2 cases of compulsion neurosis.	....	..

analysis. He finds that during the narcosis a state of passive receptivity is produced in which free association can be carried out with facility because of the removal of inhibition and the restoration of faded memory. Cloetta and Maier [16] introduced a new preparation in 1934 which has been widely used in Switzerland. Our results have not been particularly brilliant with this preparation. Broder [17] described in 1936 an abridged method for the use of sodium amytal in mental disease which seems to be particularly encouraging. In 1937 Swanson, Weaver and Chen [18] studied the physiological effects of amytal in animals and report no evidence of tolerance nor withdrawal symptoms and they conclude that the administration in animals is not followed by pathological organic changes, habit formation, tolerance or withdrawal symptoms. Kanterovitch,[19] Alexander,[20] Thorner,[21] Parfitt[22] and others have contributed very helpfully to the literature on the subject.

Technique.

The technique which has become standardized at the Pennsylvania Hospital is as follows: The *object* is to keep the patient asleep or deeply somnolent for 15 to 20 hours daily. Two periods during the 24 hours are allowed for feeding and attention to bowel and bladder functions, routine nursing care, etc. The duration of the treatment averages from 10 to 12 days.

1. A preliminary study is of great importance, in which thorough psychiatric, neurological, physical and laboratory investigations are carried out before the treatment is begun. We emphasize, particularly, search for foci of infection which may become ignited during the treatment.

2. All cases are tested with several doses of three to six grains of sodium amytal for idiosyncrasy to the hypnotic drug. Observations of pulse rate and quality, respirations, blood pressure, evidences of cyanosis and other signs of cardiovascular embarrassment are made.

3. The narcosis phase is begun with doses of three grains of sodium amytal given orally every three or four hours. Having once produced a satisfactory degree of somnolence the dose is so regulated by oral or rectal administration that the patient is kept at the desired level. It is necessary to increase the dose rather

sharply from day to day until the fourth day, when a plateau is reached, until the tenth day and then gradual withdrawal is accomplished by halving the dose, *e. g.*, 72-36-18-9. The highest dose given was in case 57 (a "manic-schizoid") where 220 grains a day were administered without evidence of untoward toxic effect.

4. A complete chart is kept showing blood pressure variations, pulse rate, respirations, temperature (rectal) every two hours, intake and output, the total dose of sodium amytal during the 24-hour period, comments regarding the patient's condition as judged by the attending nurses. It is necessary to keep close observation and nurses are instructed never to leave the patient alone. The physician must be available at all times and usually visits the patient 8 or 10 times daily.

5. The patient is kept in a darkened, quiet room with good ventilation but no drafts. All disagreeable stimuli, unnecessary noises, bright lights, audible conversations and other irritations are to be avoided. The patient must be kept lying on the side to avoid danger of swallowing the tongue or the accumulation of mucous in the pharynx. The patient is moved during the terminal phase of the narcosis to a bright, cheerful room and every effort is made to create an atmosphere of optimism and encouragement. Two thousand calories daily in the form of semi-solid or liquid diet are given. Twenty-five hundred cc. of fluid intake daily are required.

6. An emergency tray kept at all times in the patient's room is made up of the following: (a) mouth gag, (b) tongue forceps, (c) adrenalin 1:1000, (d) strychnine for hypodermic use, (e) picrotoxin (a specific antidote for amytal poisoning), (f) hypodermic syringe and needle, (g) 20 cc. syringe and intravenous needle, (h) small catheter to use as aspirator for dislodgment of mucous, (i) ephredrine sulph. gr. 3/4, strophanthin gr. 1/100; coramine; caff. sod. benzoate; digalen in ampoules and 50 per cent glucose ampoules.

7. The duration depends upon the patient's reaction to the treatment. This can be judged with fair accuracy during the semi-lucid intervals. The longest period of narcosis and the shortest accepted for report in this communication were 22 and 5 days respectively.

8. The nurse should write down all that the patient says. It is important for the physician to have a verbatim account because of

the value of the patient's uncensored remarks during the semi-somnolent periods. No effort is made at deep psychotherapy, the effort being to create a positive suggestion by means of encouraging statements, optimistic prognosis, etc.

COMPLICATIONS.

In our experience, complications have not been sufficient to produce any great alarm and are dealt with symptomatically. In a total of 115 prolonged narcosis treatments given, complications occurred in the following frequency: fever—15; mucous in throat—8; convulsions—8; retention of urine—6; aspiration—5; vomiting—4; excessively low blood pressure—4; cystitis—2; pulmonary complications—2; hiccough—2; disorders of breathing—2; swallowing of the tongue—1; cough—1; other cardiovascular complications (collapse, etc.)—1, and abdominal distention—1. We have not found evidences of severe acidosis or ketosis during the treatment in any case and we have seen no indication for using insulin and glucose. It is our belief that the fevers which have been reported by Parfitt [22] and others are due to infection rather than to the drug per se. In our experience, an adequate fluid intake has been sufficient to combat dehydration fevers. The appearance of fever in each instance we have been able to account for by infections, which can be found on careful examination. The convulsions are epileptiform in type and are preceded by a rather prolonged premonitory phase for several hours in which flightiness, apprehension, anxiety, fear, nervous twitching of the hands, coarse tremor of the lips, tongue and extremities and circumoral pallor are pronounced. These can be avoided by a slow reduction in the dose of sedative. We find no particular value in the convulsion itself although in several instances the attack has been followed by remarkable lucidity of several hours duration. Abnormal fall in blood pressure below 70 mms. of mercury systolic can become dangerous but is effectively combated by small doses of ephedrine sulphate, hypodermically, or benzedrine sulphate by mouth. In several instances vomiting has been overcome by giving the drug rectally. In our experience, it has been possible in many instances to carry through the full narcosis treatment even in the presence of a fair number of complicating factors.

Results.

In Table IV the criteria used are as follows:

Recovery means prompt remission of psychosis or discharge from the institution and continuing at the present time to maintain a social or occupational status considered normal. It means that, as far as could be determined, the recovery was directly dependent upon the therapeutic effort. Delayed recoveries are not included.

TABLE IV.

	Recovered.	Permanent improvement.	Temporary improvement.	Unchanged	Total.
Manic-Depressive (46)					
Manic	19 (60%)	2 (6.3%)	7 (21.2%)	4 (12.5%)	32
Depressed	2 (33.3%)	1 (16.6%)	1 (16.6%)	2 (33.3%)	6
Agitated depression	2 (25%)	2 (25%)	0	4 (50%)	8
Schizophrenia (46)					
Catatonic	3	1	4	5	13
Hebephrenic	4	0	1	8	13
Paranoid	2	0	3	1	6
Simple	0	0	0	2	2
Mixed ("Manic-Schizoid")	1	4	2	5	12
Total per cent	21.8%	11%	21.8%	45.4%	...
Involutional psychosis (3)	.....	1 (33⅓%)	1 (33⅓%)	1 (33⅓%)	3
Psychoneurosis (5)	1 (20%)	3 (60%)	1 (20%)	0	5
Total	34	14	20	32	100

Permanent improvement means the ability to maintain a higher level of social adjustment from the cessation of treatment to date. In some instances it means advance from an acute to a convalescent ward or return home under somewhat modified environmental status.

Temporary improvement means apparent recovery or definite clinical improvement, of relatively short duration, 10 days to 90 days. It also implies a subsequent regression in many cases ultimately reaching a level approximately equal to the one existing before the treatment. A number of patients who showed this tem-

porary improvement went on to complete recovery after having relapsed temporarily.

Unimproved or *unchanged* designate those patients in whom no change for better or worse was apparent as the result of the treatment. In this group we included also a number of patients who ultimately recovered and were discharged but whose recoveries did not seem to be directly dependent upon the narcosis treatment.

DISCUSSION.

Physiological changes under the influence of sodium amytal have been studied by a number of investigators. Broder [17] reports on the hydrogen ion concentration, carbon dioxide content, cholesterol and non-protein nitrogen changes in 12 cases during and after sodium amytal treatment and concludes that the changes were too slight to justify any dogmatic statements. Dameshek, Loman and Myerson [23] studied the blood pressure and metabolic changes resulting from large and smaller doses of sodium amytal. They found a rather marked fall in systolic blood pressure, a somewhat lesser fall in diastolic blood pressure and a fall in temperature averaging 1.1 degrees Fahrenheit. They found that the Babinski did not become positive in any case. The pupils became constricted and the most striking finding was a marked and rapid fall in basal metabolism which fell from 7 to 70 per cent from its original level, the average being 26 per cent. The oxygen and dextrose " uptake " by the brain became definitely diminished. In a small group of patients who had received long continued thyroid medication and whose basal metabolism was considerably elevated, the drug produced an extreme drop, averaging 52 per cent. The authors believe that the extreme fall in metabolism is greater than can be explained by sleep alone and therefore must be due to either, (1) the particular type of sleep, or (2) a combined effect of sleep and the depression of certain brain centers. The speculation is that the profound effect is due to a depression of the hypothalamus with a resultant effect on both sleep and metabolism. Shapiro,[24] in 1937, published observations of oxygen consumption rate in psychotic patients who had been given sodium amytal. He observed a marked fall in oxygen consumption rate but feels that there is no correlation between it and the amount of sodium amytal given nor between it and the type of psychosis

treated. He suggests that the action of sodium amytal is on the hypothalamic portion of the mid-brain. Other theories as to the beneficial effects of the narcosis treatment are to the effect that the cellular rest, and time and opportunity afforded the cellular metabolism to store up reserve for subsequent expenditure, account for the clinical improvement.

Müller [25] believed that the effect was dependent upon central anesthesia with interruption of the vicious circle of affective agitation and motor agitation. He concluded that sleep and the interruption of disease functions, by means of tissue rest, constitute the chief therapeutic effect. Klaesi [6] made a comparison between the healing effect on inflammations by application of local anesthesia, and the soothing action of the hypnotic sleep on the disturbed brain of the psychotic. Hackfield [26] believes that the autonomic dysfunctions reflected in salivary secretion and gastric secretion, etc., make up part of a vicious circle in which the cerebrum becomes disturbed by reflex action and that the effect of the drug is rest resulting in a reduction of the afferent stimuli. The therapeutic attack in narcosis breaks the cycle either in the brain stem or cerebrum producing absolute rest.

The psychological effects have been reported upon in very illuminating manner by Bleuler,[27] Lindemann [28] and others. Lindemann reports that sodium amytal in normal persons furthers the friendly contact with the outside world and decreases self-absorption. Its most marked effect is shown in individuals suffering from schizophrenia who have withdrawn their interests from the outside world. Particularly increased contact and increased interests in the outside world resulting from sodium amytal were observed in schizophrenia. It is interesting that he finds that sodium amytal which restores outside contact also restores the normal level of coordination as determined by the chronaxia method (ratio). Conversely, he finds that a drug which facilitates withdrawal from the outside world also produces a regression in the pattern of neurophysiological responsiveness (mescaline and hashish).

There is no question but that sodium amytal, in the experience of all observers, has facilitated contact and has rendered the patient accessible to psychotherapeutic efforts of the physician. The rapport is phenomenally improved in every instance. Historical data

and factors not heretofore available from the patient himself are revealed during the induction phase and later in the course of the withdrawal of the drug. Broder [17] finds that patients under the influence of amytal are amenable to suggestion and are able to develop a better understanding of the psycho-dynamics of the illness. Horsley believes that not only is the censorship reduced but there is a hyper-acute memory which serves to further facilitate psychopathologic formulations. Horsley [15] is so enthusiastic that he believes that sodium amytal narcosis of superficial depth offers a practical substitution for the methods of psychoanalysis. Jelliffe [29] has expressed it admirably in the following terms: "Amytal does away with the censorship—the hyper-vigilant control of repression. The hyper-vigilant state of hostility has been abrogated by the drug. In these periods of release one can get at the dynamics of the psychosis. The drug analytic method offers a valuable extension of our capacities for getting at and understanding repressed, unconscious material."

The rôle of psychotherapy in accomplishing recovery or permanent improvement seems to be an established one. In our experience, no particularly deep psychotherapeutic efforts are necessary. The physician's constant presence in the picture, the reassurance of his constant attendance and the solicitude of the nurses, the strong, positive suggestion of direct nature such as optimistic statements, encouragement, reassurance of recovery, etc., seem to us to be of greater significance than any efforts at deeper techniques. The nurse's notes contain verbatim records of the productions of the patient and these are of great value in reviewing with the patient in his state of restored insight the dynamics of the illness. It has been stated by others that the depth of the narcosis seemed to have little effect on its therapeutic value. In our experience, this does not seem to hold true. In those cases in whom it was thought dangerous to administer the deep narcosis a modified narcosis method has been employed but the results are not as encouraging. Likewise, in cases in which the treatment has been interrupted because of the appearance of complications, the brief period of narcosis does not seem to have been particularly beneficial.

Sakel,[30] in his discussion of insulin treatment of schizophrenia, gives a theory regarding the effects of that therapy which may be

invoked in application to narcosis therapy. Sakel and his collaborators speak of the effect of insulin upon the psychosis " in inhibiting that which is functioning (the psychosis) and in activating that which is latent (the normality)." It seems that this theory in substance means that the psychosis can be regarded as a disorder superimposed upon and inhibiting normality. If the psychosis can be interrupted, normality may temporarily, at least, break through psychosis. If the restoration is complete enough, normal reactions may be sufficiently deeply intrenched to endure more or less permanently. It would seem that in narcosis therapy this interpretation might come very close to direct application and there can be little doubt that apparent suppression of the psychotic manifestations occurs and normality is temporarily activated. It is the fixation of this temporary normality, with the help of the physicians and nurses upon whom the patient is thrown into dependent relationship, which represents recovery. The assistance of direct and positive psychotherapy, the creation of an environment which is normal, and yet which is made more desirable than the psychotic situation, represents the potent forces in the psychological aspects of the treatment. A promotion, then, of readjustment in this somewhat softened, oversolicitous, but nonetheless, real environment is the keynote to the success of the narcosis therapy.

Summary.

1. From the studies in the past six years regarding the physiological reactions which occur under the influence of sodium amytal we can conclude that the following definite changes at the physiological level take place: (a) dilation of cerebral blood vessels, (b) lowered blood pressure, (c) marked lowering of oxygen consumption rate, (d) decrease of oxygen and dextrose " uptake " by the brain tissue, (e) a change from abnormal to normal in certain neuromuscular responses as measured by the chronaxia method. The conclusion seems to be that the drug acts upon the hypothalamus affecting the sleep and metabolic centers as well as upon the higher psychic functions.

2. On the psychological level the narcotic agent promotes contact, breaks through psychotic resistance, renders the patient more accessible to psychotherapeutic endeavors and seems to enable the

patient to reveal hidden sources of conflict which in the non-narcotic state are not available either to the patient or to the physician. It transports the depressed, the agitated and involutional melancholia patient into a calm serenity which offers him at least temporary relief from his torments. Many depressions express optimism (for the first time since the onset of illness) after the first few days of treatment. There appears to be some degree of neurophysiological readjustment paralleling, and possibly constructively influencing, the psychological changes.

3. There seems to be a general feeling among those who have used the narcosis method that results in schizophrenics are not altogether encouraging. Our results show approximately a 22 per cent recovery rate which cannot be overlooked. It is true that these results do not compare very favorably with the high percentage of recoveries reported by workers with the insulin treatment in schizophrenia. Nevertheless, in many instances it has been successful.

4. The more experience we accumulate in the management of patients under narcosis therapy, the less standardized the treatment becomes. We are less likely to be dogmatic about dosage and indications for changing the course of the treatment. There is a tendency to judge trends of improvement on a basis of day to day observation and to use modifications of the treatment especially in the involutional psychoses.

5. The method is not necessarily a physical hazard if patients are chosen with care. In fact, many patients show striking physical improvement in skin color and tone, disappearance of acneform eruptions, and in two instances a pre-existing colitis entirely disappeared. The complications have, in general, not been severe in our experience. There have been no fatalities and we can say with assurance that no discoverable systemic damage has been done. We have found no need for the administration of glucose and insulin inasmuch as under sodium amytal narcosis severe ketosis does not occur.

6. The greatest therapeutic usefulness of the narcosis method is apparently in the manic-depressive group, especially in the acute manic attack. Apropos of its usefulness in interrupting the course of a manic episode, the following case will be illuminating:

CASE 86.—College girl of 19. Father manic-depressive, circular. Suddenly developed overactivity, flight of ideas, distractibility. She was placed

in the college infirmary the first day of the illness, given sodium amytal at once, moved in semi-conscious state to hospital where narcosis was given. After first seven days emerged with marked manic symptoms. Narcosis was resumed for five days. The patient emerged remarkably improved and continued with rapid, uninterrupted gains. Returned to college and finished her junior year creditably with her class. In this instance the patient was spared the deteriorating experience of an attack of full blown acute mania; the nature of her illness was not known by fellow students. Remains well one year after discharge from the hospital.

7. The conclusions of some of the other physicians who have had experience with this technique are illuminating. Bond [31] has stated that narcosis should be tried in almost every case of acute mania. He believes that acute mania, if it goes full force and untrammeled represents a deteriorating experience which permanently damages the psychic resistance of the patient. The precipitation of the patient into a state of illness where intimate bedside nursing is imperative has a powerful psychological contribution to make to the other therapeutic mechanisms of the narcosis treatment. Strecker [32] believes that the results from the narcosis therapy are significant enough to justify its continuation as a standard method of treatment. He states, "In my experience, the patients particularly benefited were those in the acute manic phase of manic depressive psychoses but any of the manifestations of the manic phase seem to be favorable for treatment. In a number of other psychotic and neurotic states, the therapy seems to be helpful. For example, in the intense agitation of involutional melancholia a modification of deep narcosis therapy has been productive of surprisingly good results." Appel [33] states that the best results seem to be obtained in young, intelligent manics. It is also useful to tide over acute schizophrenic episodes and is of great practical use in many instances in that it obviates the necessity for commitment. It is also useful in relieving the agitation and tension in certain involutional psychoses.

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DISCUSSION.

DR. FREDERICK L. PATRY (Albany, N. Y.).—Any method or procedure that improves upon nature's way of handling sickness should obviously be taken advantage of.

Drs. Palmer and Braceland merit our thanks for having focused our attention upon a type of therapy which has definitely proved its case. From a scientific point of view, one would wish that the authors present a control series of cases which respects the reaction type, age, sex, and other pertinent factors. On the other hand, the psychiatrist chiefly concerned with capitalizing treatment possibilities in every case may well point to the unenviable experience of untreated patients suffering from similar types of illness. For example, whereas the statistical average duration of untreated cases of manic-depressive psychosis is somewhat over four months, patients treated by the authors' method of narcosis therapy may recover within as short a period as two weeks, and the average is decidedly less than in untreated cases. The results in the schizophrenias are not so encouraging, but are not to be minimized, since recovery or permanent improvement is higher than the natural remission rate.

The advantages of narcosis therapy are manifold. The hazards are practically non-existent in the hands of well-trained personnel. The authors report no mortality, although a few fatalities are recorded by certain psychotherapists using other narcotics than sodium amytal, which is the drug of choice in this series. The narcosis method facilitates early treatment by making commitment unnecessary, and thus preventing so-called stigma. This latter regrettable factor would be enhanced if the patient were required to stay out of social and occupational circulation the usual time required for readjustment without narcosis therapy. Obviously, this form of therapy is advantageous in several ways: it promotes the patient's comfort and hopefulness; it is a measure of economy with respect to both duration and cost of treatment; it facilitates the handling of patients and simplifies the work of hospital personnel; it eliminates the factor of destructiveness and aggressiveness.

Of cardinal importance is the prevention of possible regression which might lead to deterioration. From the research and psychotherapeutic point of view, narcosis therapy unmasks the patient's biological functions, improves rapport and enhances the benefits of suggestion.

I should like to ask the authors if they have any data relative to treated and untreated recurrent psychotic reaction types. Also, the significance of the time factor from the onset of the present illness to the institution of treatment; thirdly, although the period of critical observation and comparison of narcosis treatment versus insulin treatment of schizophrenias is insignificant for comprehensive evaluation, I am wondering how the authors feel about this question.

DR. MARY G. SCHROEDER (Elgin, Ill.).—I am reporting two series of cases from the Elgin State Hospital. They were not so extensive as those reported

by Dr. Palmer and Dr. Braceland, consisting only of 13 cases in the first series, and 19 in the second. I am also very sorry to report that they were not so successful.

The first series of 13 cases was conducted by Dr. Magnus, of Chicago, Dr. Read and Dr. Nennancy of the State Hospital of Elgin. They were carefully selected, patients with cardiorenal or lung conditions or liver difficulties were excluded. Written permission from the responsible relative was secured in each case to protect the hospital from any difficulties. Both of these series are reported in the collected papers from the Elgin State Hospital.

Dial was used in the first series, in a modification of the Burg-Helsey method, that is 400 c. c. of a physiological salt solution was given daily by rectum, after the narcosis was established. In three of these doses of 400 c. c. each, some 60 grains of dextrose were included. The dial also was included in this salt solution, which was given by rectum, according to the Mercury-drip method. With these cases were also included 25 patients that had been treated by Dr. Magnus in Chicago. I am unable to give you the exact data of those treated at Elgin. There were 18 schizophrenias, 10 of which were catatonic, 5 manics, 3 depressives, 4 involutionals and 3 undiagnosed. Improvement was shown in 60 per cent of the manics, 50 per cent of the depressives, 40 per cent of the catatonic, and in two-thirds of the hysterics. Of the neurasthenics, 100 per cent recovered. Unfortunately, there were two deaths, one dementia præcox, and one undiagnosed psychosis.

Conclusion of the authors: sustained sleep therapy is a valuable method in manic-depressive psychosis and certain types of schizophrenia and in the psychoneuroses.

The second series was conducted by Dr. Schiller of the Elgin State Hospital, and followed very closely the method of Dr. Palmer. Fifteen grains of sodium amytal were given to induce narcosis, followed by oral feedings daily for 10 to 14 days. The patients received 3000 calories daily, and 3000 c. c. of fluid. Nineteen patients, 14 of whom were women, were given this treatment. They included 10 schizoids, one of whom recovered, and two improved; 9 manics, two of whom recovered, two improved and one died; therefore, 15.7 per cent of the manics recovered and 21 per cent improved.

Our results were not as favorable as those reported by others, perhaps because our patients were deteriorated and had been so for a long time. Because of this, more drastic methods of treatment are being carried on at Elgin now. Eight recent schizophrenics have been treated by the insulin shock method. Six of these have been paroled and have shown their previous or higher than previous level of accomplishment. One has shown no improvement. The five older cases had been sick from three to thirteen years, and only one of them has improved.

Then there is also a very interesting experiment with metrazol which is going on at present; the water soluble camphor is given intravenously in 10 per cent solution. It is begun with 1 c. c. and continued to 7 c. c., the injections being given three to four days apart. Nine cases, all old dementia præcoxes,

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are being treated. One not quite so old has been paroled after only five injections. Four cases are markedly improved, and one is ready to go home. This method shows therefore 66 per cent improvement.

Another form of treatment is that of sulphur-in-oil injections intramuscularly for the schizophrenics and for those who show chronic excitement, even the older cases, also the inaccessible, indifferent and confusional types.

A report is also included in the collected papers by Dr. Shapiro and Dr. Read of 176 newly admitted cases, contrasted with 176 admitted in 1930 who did not have this treatment. Thirteen of those treated showed remissions, whereas only three of the untreated cases in the 1930 series showed remissions; six showed marked improvement, compared with fourteen in the untreated series; twenty-four, improvement, but with relapse, as against six in the untreated group; amelioration in twenty-three, and only fifteen in the untreated; twenty-eight, amelioration with relapse, and six in the untreated.

There were no changes in 80 of these 176 patients treated with sulphur-in-oil compared with 132 in those that were untreated in 1930; therefore, 45 per cent of the 176 cases in the treated group showed no change. We are convinced of its value in chronic cases of excitement, destructive, combative tendency and filthy behavior, where any amelioration of obnoxious tendencies is so gratifying both to the hospital and to the relatives.

Dr. W. L. Moore (St. Louis, Mo.).—I would like to ask Dr. Palmer if he institutes treatment by the intravenous method, and then carries it on by rectal.

Dr. Harry A. Schneider (Coldwater, Mich.).—I should like to ask if he discontinues treatment when the patient starts to show any unfavorable symptoms, particularly rise in temperature and abnormal lowering of the blood pressure below 90 systolic.

Dr. Julius Steinfeldt (Peoria, Ill.).—Does he have an emergency outfit? and I would like to know something about the fatality rate of his material.

Dr. Harold D. Palmer (closing) (Philadelphia, Pa.).—Dr. Patry mentioned one thing which I think ought to be emphasized, that is, that it is not uncommon to carry out successfully the narcosis treatment in a case of acute mania in a general hospital.

He asks first, dc we have any data on the time factor in treated or untreated recurrent disorders. I can only say this, that in one patient who had had two manic episodes before he undertook narcosis treatment, the average without treatment had been seven months. He has had three episodes since that time, each treated with the narcosis therapy, and the average duration from admission to discharge is six weeks.

With regard to the time from onset of symptoms to the beginning of the narcosis treatment: we have not attempted to determine this figure exactly, but it is rarely longer than two weeks, and in one instance, which I had hoped to cite, was one day.

As to whether or not narcosis has much to offer in schizophrenia, I believe that we have distinctly less to offer than the insulin treatment as it is being done in this country today.

Our results so far with the narcosis treatment compare rather unfavorably with our results so far with the insulin treatment in schizophrenics. However, I wish to call attention to the fact that we have about 22 per cent recoveries in the schizophrenics treated with insulin.

Dr. Moore has asked if we ever used the intravenous method for induction of a prolonged narcosis therapy. We have discarded intravenous altogether, because it is unnecessarily hazardous. The only severe complication we had was a cardiovascular collapse, necessitating intravenous adrenalin and artificial respiration; it was a case in which sodium amytal had been very carefully given intravenously. We induce the sleep by oral doses, or where we don't get sufficient cooperation, by some restraint and rectal administration.

Dr. Schneider asks if we continue in the face of certain complications. Yes, we continue with temperature rises as high as 101 or 102, if the rise in temperature cannot be attributed directly to some organic or some infectious focus. Not uncommonly we ride through a rather high fever by giving symptomatic treatment. As to falls in blood pressure below 90, we very commonly carry on through falls of blood pressure with a systolic going as low as 70. We have found ephedrine sulphate given hypodermically to be almost specific in dealing with this fall in blood pressure due to the barbital sedatives.

Time did not permit me to give the description of the outfit in the discussion of technic. However, it consists of tongue forceps, mouth gag, adrenalin solution, strychnine solutions, picrotoxin, a hypodermic syringe and needles, a 20 c. c. syringe for administration of intravenous glucose if we feel it necessary, a nasal catheter for use if respiratory blocking occurs, and we have ampules of strophanthus, coramin, digitan, calcium benzoate, ephedrine sulphate—in other words, a tray which might be at the bedside in any general anesthetic administration.

HYPERTHYROIDISM AND PERSONALITY.*

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Physicians working with hyperthyroid patients have increasingly stressed the importance of the frequency with which such patients have experienced some emotional shock or strain just prior to the recognized onset of the illness. With varying emphasis, the rôle of such emotional shock or strain has been discussed as to the etiology or as to the precipitation of the clinical pictures of hyperthyroidism.

We shall consider the significance of the particular emotional shock or strain in the total life process of each of 15 individuals who have developed hyperthyroidism. Why have the experiences reported caused emotional shock or strain in these particular individuals? Kahn and Cohen [1] have postulated that "each individual brings into the world *his* capacity to experience, and each individual differs from every other individual in that all his capacities, necessarily including his capacity to experience, have been derived fundamentally from the biological potentialities which he has inherited from his progenitors," and "that one can deal with experience and the way of experiencing as springing from the biological makeup of the individual." We consider emotional experiences as definitely based on biological processes related to the nervous and endocrine systems. This implies that the endocrine system, and within it the thyroid gland, is instrumental in determining the individual's capacity to experience and consequently his way of experiencing.

Whenever thyroid pathology occurs it is observed that the behavior of the individual, that is his experiential expressions, are more or less changed. This is what seems to happen: emotional factors precipitate a thyroid imbalance with a change of behavior

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or experiential expression. The question is: is this biological and experiential change brought on as something perfectly new in the individual, or was there any sort of susceptibility or readiness in the individual biologically to react and experientially to express himself in this manner?

With this question in mind, 15 patients have been studied and the data analyzed in the following manner.

Observations.

Family History.—The family history of each patient was investigated in an attempt to find evidence of nervous instability in the parents or siblings.

Case 1.—The mother was nervous, hyperactive, energetic, excitable and easily worried. The father died of suicide attributed to an unhappy second marriage. A daughter is extremely "nervous," and because of this, is a source of worry to the patient.

Case 2.—The father was extremely irritable and excitable. The mother is excitable with definite mood swings. Two sisters are both hyperexcitable and exhibit enormous amounts of drive. The examiners have noticed that one sister demonstrates a definite bulging of the eyes when she becomes excited.

Case 3.—The mother was extremely excitable and irritable. Her excitability was extreme and through it she met her death when upon hearing a fire alarm she became terrorized, tried to run, slipped and fell downstairs, receiving fatal injuries.

Case 4.—No notable findings in the family history.

Case 5.—The mother was always excitable and showed a tendency to worry enormously. When her son entered the army during the World War she became extremely depressed and worried and showed the complete picture of a depression. She became worse gradually, although her son was never in real danger. She died on Armistice Day.

Case 6.—One sister died in diabetic coma. She was not known to be ill until she was found in the coma. One sister died of some advanced gastric disturbance. She was not known to be ill until the terminal stage of the illness was reached.

Case 7.—The mother was excitable and had cardiac hypertension for many years.

Case 8.—The father was nervous and restless and had frequent headaches. The mother died after several cerebral accidents. Although she was excitable and emotional, she never complained and while she was dying she ordered her children not to cry. One sister has had occasional "nervous breakdowns."

CASE 9.—The father recently had a leg amputation resulting from endarteritis. The mother had what is referred to as "shaking sickness" for the last five years of her life.

CASE 10.—No notable findings in the case history.

CASE 11.—The mother is a small nervous person who was always over anxious and very excitable.

CASE 12.—Most members of this family are irritable and excitable.

CASE 13.—The father was a sensitive, irritable alcoholic. A brother is sensitive, irritable and easily excited.

CASE 14.—Both parents were sensitive and unstable. The father committed suicide.

CASE 15.—The father dominated his family by constantly complaining of his stomach trouble. This same method of domination is now directed toward the patient.

NOTE.—All but two of our cases yielded evidence of a strong familial tendency toward nervous instability.

General Personality Traits.—Each patient's pattern of response to ordinary life problems is briefly summarized.

CASE 1.—Generally tense with a strong sense of responsibility, a sense of insecurity and a tendency to accept conflicts and difficulties as routine without complaint.

CASE 2.—Felt responsibility keenly, was extremely sensitive; he never admitted insecurity but constantly fought it.

CASE 3.—Generally anxious, insecure, easily frightened and tense. Constantly directed her energy toward gaining security. Never complained but accepted difficulties as routine.

CASE 4.—Generally anxious, but never complained. He had a strong feeling of responsibility and insecurity. He has put up a constant fight against insecurity.

CASE 5.—Generally anxious with fear of insecurity, but never complained. Actively fought difficulties which threatened her security.

CASE 6.—Generally anxious and tense with a marked fear of insecurity. He was easily disturbed emotionally, but declared he took things as they came.

CASE 7.—Constantly tense and anxious and for many years under a strain, but never admitted feeling anxiety or stress until she talked to the examiner.

CASE 8.—Responded to prolonged mental stress by bearing it in silence for a period of 34 years.

CASE 9.—Generally tense, anxious and obviously insecure, but says, "I leave well enough alone; I don't complain."

CASE 10.—A tense, anxious person with a strong sense of responsibility who never mentioned worries or fears to others.

CASE 11.—Generally apprehensive and fearful of death. Insecure and easily worried. Cried easily, but never in the presence of others.

CASE 12.—Strongly attached to his mother, he showed a marked need for approval. Assumed much responsibility as a salesman, but showed constant fear of disapproval. Never admitted any symptoms until they were thoroughly severe.

CASE 13.—Generally an active, energetic person who faced a very difficult situation without recognizing that it might be unusual. Struggled hard against insecurity.

CASE 14.—Generally immature and insecure. A jealous rival with her sister for her father's affection. Displayed a definite need for approval and attention. Had a strong sense of responsibility which led her to support a parasitic husband, even during her illness.

CASE 15.—Generally insecure and afraid of disapproval. She showed a marked sense of guilt and a strong sense of duty. Accepted many difficulties as routine and did not complain.

NOTE.—In their premorbid lives these people tend to *suffer in silence.* They combine an extreme feeling of personal insecurity with a strong sense of responsibility. Frequently they attach themselves to someone (a parent or parent surrogate) upon whom they depend for guidance and protection. Psychic trauma finds no outward expression, but is turned within. Similar traits in hyperthyroid patients have been observed by Agnes Conrad.[2]

Premorbid Psychopathic, Endocrine and Autonomic Nervous System Disturbances.—The majority of our patients show evidence of having had psychopathic, endocrine or autonomic nervous system disorders long before the hyperthyroidism developed.

CASE 1.—Fainting attacks at 14. Sweating of palms in response to emotional disturbance all her life. Has never been able to dance because it made her dizzy. Circumscribed period of depression at 28, duration three months. A second milder circumscribed depression at 40, duration two years.

CASE 2.—Tremor and bulging of the eyes in response to emotional stress in early life. Glycosuria. Chronically hypomanic.

CASE 3.—Sweating of the palms and soles of the feet in response to emotional disturbance since childhood. Frequent spells of blueness all her life ranging in duration from a few days to a few weeks, with one or two such spells lasting for periods of about two years each.

CASE 4.—Past history negative in this respect.

CASE 5.—Intermittent fainting spells, sweating of the palms, soles of the feet and the middle of the back in response to emotional disturbance.

CASE 6.—Sweating of the palms and soles of the feet all of her life in response to emotional disturbance.

CASE 7.—Nervous, anxious and excitable as a child.

CASE 8.—Profuse sweating of the palms and soles of the feet in response to emotional stress since childhood. Also flushing of the face and tachycardia. Excessively fearful, to a degree that she will not sit with her back to a door for fear that someone will come in when she isn't looking. Had several "nervous breakdowns," the first about one year after her marriage.

CASE 9.—Past history negative in this respect.

CASE 10.—Past history negative in this respect.

CASE 11.—Marked fear of dying associated with depresson at various periods throughout life. Has experienced this particularly during pregnancies.

CASE 12.—After multitudinous sexual activities with women of questionable character became engaged to a "good woman," and thereafter developed sexual impotence, necessitating postponement of the marriage.

CASE 13.—Unusually overactive and sensitive.

CASE 14.—A definite period of depression in 1924, at the age of 22, and a definite manic episode in 1932.

CASE 15.—Past history negative in this respect.

NOTE.—The vulnerability of these patients to emotional and vegetative nervous system disorders is frequently manifested symptomatically before hyperthyroidism develops.

Onset of Illness.—Comparisons are made in each case of the date of the recognized onset of the symptoms of hyperthyroidism and the date on which the patient was first seen by a physician.

CASE 1.—Onset 1924—restlessness, gastric symptoms, fatigue, tremor and hyperexcitability. Consulted a doctor in 1928.

CASE 2.—Onset 1932—irritability, fatigability and restlessness. Consulted a doctor in regard to insurance in 1935.

CASE 3.—Onset in 1935 with fatigue, nervousness, irritability and profuse sweating. Consulted a physician one year later.

CASE 4.—Onset in 1931 with nervousness, fatigability and weakness. Consulted a doctor in 1936.

CASE 5.—Onset in 1930 with sweating, blushing, shaking and loss of weight. Consulted a doctor in 1935.

CASE 6.—Onset in 1934. Family noticed nervousness, restlessness and irritability and loss of weight. Because of a spell of vomiting, she was brought by her family to a doctor in 1936.

CASE 7.—Onset in 1935 with sweating, flushing, tachycardia, weakness and spells of vomiting. Consulted a doctor a year later.

CASE 8.—Onset in 1897. Noticed swelling in the neck following a nervous breakdown. Treated by quack methods such as electrical treatments, chiropractic, etc., at intervals until she came to a doctor in 1935.

CASE 9.—Onset in 1935 with tachycardia, nervousness, dyspnea and weakness. Consulted a doctor four months later in 1936.

CASE 10.—Onset in 1923. Noticed weakness, nervousness and tremor and went for a trip with poor results. She was brought to the hospital because of bromide intoxication in 1934.

CASE 11.—Onset in 1933 with sleeplessness, irritability, tremor, and nervousness. Consulted a doctor in 1935.

CASE 12.—Onset in 1934 with restlessness, irritability and loss of weight. Entered hospital in 1935, one year later.

CASE 13.—Onset in 1935 with palpitation, dyspnea on exertion, precordial pain, tremor and weakness. Consulted a doctor about a year later.

CASE 14.—Onset in 1935 when the patient noticed weakness, loss of weight, general malaise. At that time she went to a physician complaining of a pain in the lower right abdomen; appendicitis was diagnosed and an appendectomy done. Hyperthyroidism was diagnosed in 1936. The patient, however, would not recognize the necessity for treatment until 1937.

CASE 15.—Onset in 1928, a lump in her neck was first noticed. She felt tired and weak, had some tremor and went to a physician at the time because she noticed small lumps in her breasts. The physician attributed the difficulty to pus in the tonsils. Hyperthyroidism was diagnosed in 1931.

NOTE.—With few exceptions these patients have persisted in attempting to fulfill their responsibilities in the face of the taxing symptoms of hyperthyroidism. Their first visit to a doctor has frequently been for secondary reasons such as to have a boil lanced or for an insurance examination. Some

of them have come only after the vigorous urging of their family or friends. Others consented to see the doctor only after they were totally incapacitated. In most cases the actual onset of the gross symptomatology has occurred more than a year before the doctor has been consulted.

Precipitating Situations.—In each of these cases there has been a definite disturbing situation experienced by the patient just prior to the recognized onset of hyperthyroidism.

CASE 1.—A combination of the loss of her son, her husband's bankruptcy and a controversy over her daughter's unhappy marriage.

CASE 2.—An unbearable partnership in business about which he remarked, "He has me in prison; how am I going to get out?"

CASE 3.—Loss of life's savings and constant unemployment of both the patient and her husband.

CASE 4.—An open fight with his two brothers followed by financial stress and unemployment which came one month after assuming the responsibility of marriage.

CASE 5.—The husband's unemployment followed by extreme financial stress.

CASE 6.—The death of a favorite sister and the responsibility for that sister's children.

CASE 7.—An increasingly difficult marital situation becoming unbearable in the light of the patient's increasing age.

CASE 8.—A termination of a prolonged intolerable marriage by divorce which instead of relief produced feelings of insecurity and guilt.

CASE 9.—The death of her mother and more recently her father's leg amputation.

CASE 10.—The loss of her husband followed by a losing struggle to earn a living during the business depression.

CASE 11.—Financial strain, her husband a chronic invalid and a daughter who is too "nervous" to work.

CASE 12.—After becoming engaged the patient became sexually impotent and put off the marriage many times. Illness developed during this period of uncertainty.

CASE 13.—A prolonged strain wherein the patient attempted to fulfill the demands of an unsympathetic husband who was sexually incompatible and chronically alcoholic. This during a period of financial stress.

CASE 14.—An incompatible marriage which left her forced to support a parasitic husband and a child on the inadequate income of a librarian.

CASE 15.—The recent and severe illness of a daughter and the recently assumed responsibility for the care and maintenance of both of her parents who were constantly quarreling between themselves.

NOTE.—In each instance the precipitating situation has represented a threat to the patient's security, either by loss of guidance and protection, or increased responsibility.

Pathological Reports.—Pathological reports of the resected gland material were obtained on all operative cases. On the two unoperated cases a description of the palpable gland was recorded.

CASE 1.—Hyperplasia of the thyroid gland.

CASE 2.—Hyperplasia of the thyroid gland.

CASE 3.—Hyperplasia of the thyroid gland.

CASE 4.—Hyperplasia of the thyroid gland.

CASE 5.—Hyperplasia of the thyroid gland, (slight) colloid adenoma.

CASE 6.—Hyperplasia of the thyroid gland.

CASE 7.—Diffuse hyperplasia of the thyroid.

CASE 8.—Adenoma of the thyroid.

CASE 9.—Hyperplasia of the thyroid, and hyperplasia of lymph node.

CASE 10.—Hyperplasia of the thyroid.

CASE 11.—Hyperplasia of the thyroid.

CASE 12.—Hyperplasia of the thyroid.

CASE 13.—Unoperated. Gland was enlarged, smooth and soft. The symptoms responded to iodine therapy.

CASE 14.—Hyperplasia of the thyroid.

CASE 15.—Unoperated. The gland was enlarged, smooth, soft and not nodular. The symptoms had responded to radiation of the thyroid repeatedly.

NOTE.—Of the 13 pathological reports, 12 were hyperplasia of the thyroid gland, and one (8) was adenoma of the thyroid. In the two (13 and 15) unoperated cases the gland was definitely palpable, soft and smooth, and gave the clinical impression of hyperplasia. One of these (13) responded readily to iodine therapy, and the other (15) had yielded symptomatically to radiation of the gland several times before coming to our clinic.

Postoperative Course.—All of these patients are still being followed by one or more departments of the New Haven Hospital.

CASE 1.—This patient had a recurrence of hyperplasia of the thyroid two years after the first operation and shortly following a new emotional disturbance. At present, about 18 months after the second operation, she is again in a stressful situation and is experiencing recurrence of symptoms.

CASE 2.—The patient had a recurrence of symptoms followed by a manic attack and hospitalization. Following the operation he returned to the original stressful situation.

CASE 3.—The patient had some immediate relief, but most of the symptoms are retained and recently have become progressively worse. She returned to an unchanged stressful situation.

CASE 4.—After nine months the patient is apparently symptom free. Since operation he has been under no particular strain.

CASE 5.—Symptom free for eight months, but began to develop headaches similar to those experienced preoperatively about two months ago. The patient is still under strain.

CASE 6.—When seen about four months after operation the patient was still experiencing weakness and fatigability, but was improving. She was under no particular strain and had been free from sources of worry since the operation.

CASE 7.—After six months there was some improvement; the patient is still tense, anxious and weak. She is still under emotional strain with her original situation unchanged.

CASE 8.—Remarkable symptom relief after operation followed by a definite recurrence of all symptoms after the patient became involved in a difficult court litigation.

CASE 9.—Complains of feeling cold, shows a low B. M. R. of about −16 and a marked exophthalmos in the right eye only.

CASE 10.—After one year the patient still experiences marked tachycardia and weakness.

CASE 11.—After two months patient was greatly improved, although still weak and easily fatigued.

CASE 12.—Showed no exophthalmos before the operation, but developed a marked postoperative exophthalmos.

CASE 13.—Not operated. This patient has been readmitted to the hospital, and any attempt to relieve or alter her stressful situation has failed. It is noted that when she leaves that situation and enters the hospital her symptoms are relieved and her B. M. R. goes down.

CASE 14.—The patient is still overactive and irritable, but still shows weakness. She has returned to the original stressful situation.

CASE 15.—Not operated, but relieved by radiation after which she was symptom free until the death of her mother when the symptoms recurred in full and were again controlled by radiation at intervals for about three years. She is at present hospitalized because of a bizarre psychosis including symptoms of tension and anxiety.

NOTE.—It is apparent that with whatever success treatment is directed toward the thyroid gland, the fundamental way of experiencing of the patient is not altered. If, after treatment, the patient returns to the same or a new stressful situation or experiences further shock, recurrence of the whole picture of hyperthyroidism is likely. Relief from stress and strain is essential to continued recovery.

Our patients have four points in common: first, a constitutional predisposition to hyperthyroidism; second, a way of experiencing which involves a peculiar susceptibility to emotional shock or strain; third, a severe disturbance in the form of a sudden shock, or a prolonged strain, or both, prior to the recognized onset of their illness; the fourth is hyperplasia of the thyroid.

DISCUSSION.

CONSTITUTIONAL PREDISPOSITION.

With Warthin [3] we contend that the potential predisposition to hyperthyroidism is present in the individual at birth, and that it is constitutional in nature. Various metabolic and nervous disorders may be discovered in the families of these patients. Thyroid disorders, diabetes, cardiac hypertension, general nervous instability, and evidence of manic depressive psychosis are among the most common. Such evidence strongly indicates the importance of the hereditary factor in the production of this constitutional group.

In general our patients have soft thin skin, rounded and soft body tissues, abundant hair, and youthful figures. These features are among the "chief morphologic stigmata" of Warthin's "Grave's Constitution." These people showed a marked tendency to blush under the observation of the examiner, and most of them were unconscious of it. At times, when patients were asked if they blushed easily, their faces would rapidly redden while they, in all sincerity, stated that they had never blushed in their lives. Un-

consciousness of gross signs of lability of the autonomic nervous system probably explains the difficulty in eliciting evidence of nervous instability from the premorbid histories of some hyperthyroid patients.

Hyman and Kessel [4] and others contend that hyperplasia of the thyroid is secondary to and symptomatic of autonomic imbalance. Our findings suggest that a labile autonomic nervous system is involved in the constitutional predisposition to hyperthyroidism. This suggestion is supported by the fact that in some of our patients such symptoms of hyperthyroidism as sweating and tachycardia, which are vagosympathetic in origin, are exaggerations of disorders already present before the onset of the disease, and do not always disappear after thyroidectomy.

While the thyroid gland is admittedly not solely responsible for the production of hyperthyroidism, it is highly improbable that it is an innocent bystander. The fact that when hyperplasia occurs many symptoms are exaggerations of premorbid behavior, and that subtotal thyroidectomy subdues these symptoms which recur with further hyperplasia, is incriminating. Regarding the development of some of the characteristics of exophthalmic goiter, Boothby [5] has suggested that they " may be secondary to a peculiar irritation or some stimulation of the vagosympathetic system "; and " that the origin of this sympathetico-stimulating substance is in the thyroid is indicated in man by the fact that partial thyroidectomy, even without the administration of iodine either abolishes or decreases in the large majority of instances the intensity of the characteristic symptoms of exophthalmic goiter attributable to this substance." W. O. Thompson [6] has pointed out that " the peculiar nervous manifestations of exophthalmic goiter appear to be satisfactorily explained as exaggerations of the customary reactions of the patients who are usually of the emotionally unstable type." Our data support his conclusions, but we further maintain that the prehyperplastic thyroid gland influences the " emotionally unstable " way of experiencing of the premorbid person in the same direction, if to a lesser degree, as does the hyperplastic thyroid influence the " peculiar nervous manifestations " of the person with hyperthyroidism. A sensitive thyroid gland which is susceptible to hyperplasia figures in the premorbid constitution.

THE WAY OF EXPERIENCING.

The biological makeup of individuals with the constitutional predisposition to hyperthyroidism is fundamental in the production of a characteristic way of experiencing. The outstanding common features in all these personalities are: an extreme feeling of personal insecurity, a strong sense of responsibility, and a tendency to suffer in silence. The feeling of insecurity leads them to seek sources of protection. This accounts for the fact that some of them maintain prolonged attachments to parents, or attach themselves to other personal protectors. They also value highly such sources of ego security as their savings or their jobs. The sense of responsibility is probably born of their directing their energy toward protecting, maintaining or pleasing their sources of ego security. Agnes Conrad [2] has mentioned, in this respect, the need for the approval of the parent. It may well be a fear of disapproval which prevents their complaining and leads to the tendency to suffer in silence. This feature is seen in its advanced form in some of our patients who persist in fulfilling their responsibilities without complaint for long periods after the onset of clinical hyperthyroidism.

Any threat to the security of such persons is experienced by them as an emotional shock or strain. In spite of the lack of complaint, we see evidences of the effect of this emotional trauma in the premorbid lives of some of our patients who have apparently manifested susceptibility to other conditions before the development of hyperthyroidism. Personalities constitutionally predestined to the way of experiencing common to these patients are naturally vulnerable to manifestations of any predispositions to nervous or endocrine disorders they may possess.

PRECIPITATING SITUATION.

It is not an incident but the way an individual experiences an incident that produces emotional shock or strain. Some persons may meet or constantly deal with problems which threaten or actually damage their personal security with little or no emotional disturbance. Not so our patients who with their innate feelings of insecurity experience any threat or damage to their security as a definite emotional trauma. Some insecure persons, it is true, may

experience threats to their security with emotional trauma and show no resulting damage to their endocrine systems. Some of these find outward expression for their emotions. Some turn them within with resulting damage to other more labile parts such as the gastro-intestinal or cardiovascular systems.

It is our contention that in the patients studied the development of hyperthyroidism has not been due to the operation of only one or some of the components of the pre-hyperthyroid personality. It is a result of the interaction of the total combination. This interaction is set in motion by situations encountered by these personalities and experienced in their way. In each instance the precipitating situation has represented a threat or damage to the patient's personal security.

COMMENT.

While this combination is certainly not offered as a universal etiology for hyperthyroidism, our data indicate that some cases develop in this manner. The constitutional susceptibility must naturally vary in degree in different individuals, some requiring greater stimuli to set them in motion than others. The individual's susceptibility doubtless fluctuates in response to such factors as the general physical status and the amount of available iodine.

The study of the premorbid histories of these patients reveals many common personality traits. In the future the recognition of such traits in other persons should lead to the suspicion that they might fall into the hyperthyroid susceptible group. Once the susceptibility is discovered effective prophylaxis may be applied.

CONCLUSIONS.

1. There is a constitutional predisposition to hyperthyroidism implicating a sensitive thyroid gland.

2. The way of experiencing of persons constitutionally so predisposed involves: (1) an extreme feeling of personal insecurity; (2) a strong sense of responsibility; and (3) a tendency to turn the effects of emotional experiences within rather than give them outward expression.

3. Any threat to the security of persons with this constitution and way of experiencing may produce a serious emotional disturbance.

4. Prolonged emotional strain, severe emotional shock or a combination of the two may precipitate hyperplasia of the thyroid gland in these personalities.

5. Certain personality features of this constitutional type are sufficiently similar to give definite clues for the recognition of persons possessing a predisposition to hyperthyroidism before the clinical picture of the disease develops.

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DISCUSSION.

DR. FRED P. CURRIER (Grand Rapids, Mich.).—One deems it a privilege to discuss this paper by Dr. Brown and Dr. Gildea. To those of us who have spent our medical lives in one of the important goiter regions, a paper which contributes either to the therapeusis or prevention of hyperthyroidism is of special interest.

As a fundamental groundwork, the authors quote Kahn and Cohen, as follows: "Each individual brings into the world his capacity to experience and each individual differs from every other individual in that all his capacities, necessarily including his capacity to experience, have been derived fundamentally from the biological potentialities which he has inherited from his progenitors."

One must ask himself if one's capacity to experience does not connote quantity and if so, is it not logical to ask how are we to measure this capacity which one brings into the world and which from the very beginning is impressionable.

We are presented with the family histories of 15 cases, all but 2 of which showed strong familial tendency toward nervous instability, but in these family histories we note that there is not one case of actual hyperthyroidism.

The authors state that various metabolic and nervous disorders, such as diabetes, hypertension, cardiac disorders, discovered in the family histories of these patients, constitute evidence of the importance of the hereditary factor in the production of this constitutional group. If such be the case, wherein are we justified in associating the findings specifically with thyroid disease?

We are later told that W. O. Thompson has pointed out that the peculiar manifestations of exophthalmic goiter appear to be satisfactorily explained as exaggerations of the customary reactions of the patients who are usually of the emotionally unstable type. The authors state: "Our data support his conclusions but we further maintain that the pre-hyperplastic thyroid gland influences the 'emotionally unstable' way of experiencing of the premorbid person in the same direction, if to a lesser degree, as does the hyperplastic thyroid influence the peculiar nervous manifestations of the person with hyperthyroidism."

Such a statement challenges one's curiosity and we would be pleased to know what chemical or microscopic evidence there is to support it. Boyd, the pathologist, states that during life the thyroid is continually being acted on by stimuli of various kinds, chemical, bacterial and psychic, which tend to induce hyperplasia.

We also know that there are certain nuclear groups in the hypothalamus which are closely associated with all the symptoms of exophthalmic goiter. Still we do not know the real cause of hyperthyroidism. We do know that removal of part of the gland may alleviate the symptoms. Is it not reasonable to suppose then that even the term "hyperthyroidism" may be an improper one for the disease?

This paper has brought to our attention some of the important signs and symptoms in cases of potential hyperthyroidism and in doing so suggests a method of attack useful in prevention.

Dr. Eugen Kahn (New Haven, Conn.).—Dr. Currier has said that the real cause of hyperthyroidism is not known, and we agree with him. We have not maintained that the real cause of hyperthyroidism has been found. What Drs. Brown and Gildea tried to do with this group of patients and what they are now doing with another group of patients with other clinical manifestations is this: They look over the personality and the history as far as they can get hold of them, always asking themselves the question, "What kind of people are these?"

We are of the impression that in this series of 15 cases, which were not selected but just taken, as far as I know, at random as they came to the medical clinic and wards, definite trends were found that these people had in common. Nobody would say today all hyperthyroid patients belong to this kind of personality, but these people obviously do.

There are three points I would like to allude to briefly. I have the impression in this group of patients that there is a definite physical disorder, namely, the hyperthyroidism; that there are emotions that certainly play a rôle—there is always a situation tied up, of course, with these emotions; then there are the therapeutic problems, what to do eventually as to prevention of this disease. In this connection there is one thing I would like to stress. We sometimes feel that in some places our internists and our surgeons may not be very accessible to psychiatric cooperation. In our own center we are fortunate in this respect. I do think that the psychiatric contribution would in many instances be useful to the surgeon and to the internist in a better understanding of these patients and as a result one might not infrequently save a patient his thyroid.

Dr. William L. Nelson (St. Louis, Mo.).—It is not a long throwback to the time that I graduated in medicine. At that time, hyperthyroidism was looked upon as an involvement of the thyroid gland *per se*. As a student, I accepted this view of our teachers, but as I thought of thyroid conditions and began to be interested in mental and emotional states, I began to appreciate the make-up of some of these people prior to the time that they developed their hyperthyroid state; and when I say hyperthyroid state I refer to the non-adenomatous character of thyroidism. Surgeons continued to operate on the basis that it was a local condition within the thyroid gland and a small percentage of the operated cases (I say that advisedly) showed definite signs of improvement. But many of the cases that were operated upon, the ones who survived—because early mortality was great—had a recurrence of their symptoms.

I have held for a long time that the condition manifest through the thyroid gland was not a condition that was located entirely within the gland but that we had something more fundamentally involved than that. I have looked upon the autonomic nervous system as a big factor in the condition.

I realize I am not going to present to you a primary cause of hyperthyroidism, but I am going to look more fundamentally than in the thyroid gland for its origin. The pathologists of more recent years have taught us that the individuals developing hyperthyroid states usually show a persistence of embryological structure that is immature, and we conclude in the clinical analysis of many of these patients that they have other constitutional defects, as Dr. Brown has mentioned, or inadequacies that go along with this.

I make these remarks for this purpose: It seems to have taken a long time for the surgeons to come to the conclusion that there is something more involved than a mere thyroid gland structure. I think the presentation of this paper may be a suggestion to us to think more carefully of our patients in regard to operations upon them, because I know of at least two internationally known surgeons who do a great many operations on patients of this kind, and who have in the past few years refused to operate upon such patients unless they can be under careful supervision and control for a period of a year or eighteen months subsequently, such as the psychiatrist would undertake without operation.

I have compiled data upon some 80 cases of hyperthyroidism that have been treated medically, so to speak, as against some 70 that have been treated by operative procedure. The results in the non-operative cases have been equally as favorable as in the operative ones.

When such men as Charles Mayo make the statement (as I heard him make it a few years ago) that in dealing with hyperthyroidism we should only resort to surgery as a last resort, it seems to me that we have to do with a personality representation in which the thyroid gland is simply one of the integral part; and if we are going to deal successfully with our patients, we have to deal with them on the basis of their total personality, looking to sources more fundamental than the mere functioning of a gland, which is only the expanded end of the nervous system, for the cause of the difficulty.

DR. JOHN A. P. MILLET (New York, N. Y.).—I have just one addition to make to what the last discussor has said. It seems to me that his remarks about the autonomic nervous system form perhaps the keystone to this whole problem. The remark that I have to make is with relation to the anxiety factor. It has been brought out by Dr. Brown that latent anxieties have existed in these patients for many years, long before the hyperplasia of the thyroid occurred. It has also been stated by him that these patients for the most part were equally unaware of their autonomic imbalances, as they were of the existence of anxieties. This brings up the whole question of the physiology of anxiety.

We might pause for a moment to think that the latent anxieties of childhood are perhaps fundamentally the expressions of this autonomic imbalance and of the effects that it produces upon the functioning of all the vital organs.

DR. NOLAN D. C. LEWIS (New York, N. Y.).—I should like to emphasize the point that in hyperthyroidism we have one of those conditions in which there are definite constitutional factors as such, where there are releasing factors in the situation, and where we have behavior reactions to study. There are several other such conditions or situations in psychiatry, and it is my belief that the great contributions in the future are to come from studies of this character.

It takes the double-barreled type of mind to carry on such studies, a mind which uses one sight for both barrels, each of which perhaps carries a different bore and a different load of shot, but which hit the mark in the same place.

DR. WARREN T. BROWN (closing) (New Haven, Conn.).—I am extremely thankful to all those persons who discussed the material. There are two or three questions I would like to touch on hurriedly. First, one thing that was mentioned was the capacity of experience which the individual brings into the world as impressionable. I agree thoroughly, it is impressionable, as I pointed out in the paper by saying that each of these individuals has been impressed by a situation which occurred just prior to the onset of the illness.

I also agree that the development of the personality after it is brought into the world is entirely impressionable by a number of things.

The question of heredity was brought up. I agree that none of the families had actual hyperthyroidism, although in pointing out the hereditary pattern, what I wish to say was that in the families of these individuals there was a large amount of irritability, of sensitivity of the nervous system.

One of the discussants remarked that the thyroid gland influences the emotional stability. That point was questioned. The person who questioned it listed a number of things that affect the thyroid gland; among the things he listed were psychic effects. The question answers itself.

As to the selection of cases, these cases were taken at random from the thyroid patients being followed in the department of metabolism and the department of psychiatry at Yale University.

I agree that the term "hyperthyroidism" will probably become obsolete and an important universal term will ultimately be applied.

As to the question of cause of hyperthyroidism, we tried to point out in this material what types of individuals we have found who have developed hyperthyroidism, the actual cause of the hyperplasia of the thyroid gland, I leave to the physiologist.

THE SIGNIFICANCE OF SPECIAL READING DISABILITY IN MENTALLY HANDICAPPED PROBLEM CHILDREN.*

By THORLEIF G. HEGGE, PH. D.,

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Special reading disability is a condition in which the reading status is markedly retarded as compared with achievement in other academic subjects, notably arithmetic, and with general learning ability as measured by intelligence tests. It is implied that normal educational opportunities have been available and that the acquisition of a reading ability in the ordinary sense of the word is not excluded by visual defect. Special reading disability is thus defined by a psychological and educational pattern of abilities and disabilities. No other suitable criteria are available at present. For various reasons these cases have experienced specific difficulties in learning to read as compared with other children of corresponding mental age. This appears to be the only characteristic which all of them have in common.

To Samuel T. Orton goes much of the credit for having brought a functional viewpoint into the foreground as opposed to the earlier concept of congenital word blindness. Most of the work in this field has, however, been done by psychologists and educators, a particularly noteworthy contribution being that of Marion Monroe, who began her work under Orton, later became associated with the Institute for Juvenile Research in Chicago and is now active in Pittsburgh. It is to be regretted that Orton has found so few followers in the psychiatric profession. For the psychiatrist should be in a position to make contributions to several aspects of the

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The author wishes to acknowledge his indebtedness to Robert H. Haskell, M. D., Medical Superintendent of the Wayne County Training School, and to several associates who have carried the main burden of the reading work.

problem and it is probable that the experience thus gained might prove to be a valuable asset to psychiatric theory and practice.

Reading disability is certainly a formidable problem in present day education. It is probable that at least 10 per cent of the public school population is retarded to such an extent as to be in need of correctional work. It is also evident that an extreme reading disability, which is not eliminated in time, is likely to have a profound influence upon the destiny of an intellectually normal individual. The public schools are just beginning to attack the problem of prevention and cure. The outlook is encouraging since we know that almost all cases are trainable and since we have a right to assume that many of them can be prevented. In many quarters ignorance is still profound, however.

Turning to the mentally handicapped we realize that their general limitations render the importance of a special reading defect less obvious in their case. It is our aim in this paper to attempt to show that the problem is a truly significant one in this group also.

Approximately 90 per cent of the high grade moron and the borderline cases will, under present day methods of class instruction, develop a reading ability roughly corresponding to the expectancy for their mental age. When leaving school they will, on the average, have acquired a fourth grade ability and many will read much better than that. In other words, they become literate. Such a reading ability has, in many cases, vocational and recreational value and it always represents an additional insurance against failure in the community as well as against feelings of inferiority. From one-third to two-fifths of the adult American population reads below the sixth grade level. It is therefore evident that the educational standing of properly educated persons who have been diagnosed as mentally handicapped is in harmony with that of other persons of their own social level.

Although the education of the mentally handicapped must stress recreational, manual and vocational activities, social standards as well as educational ideals require that reading be taught to the members of this group who can be classed as trainable. However, if we must teach reading to the mentally handicapped we must also recognize the importance of extreme special reading disability in the group. About 10 per cent of them do not learn to read in school.

All such reading cases must be taught to read, if possible, and in the Wayne County Training School we have long since established the fact that it is possible to teach almost all of those who have a Stanford-Binet I. Q. of 60 or more.

Since 1929 some 80 institutional children have been trained and studied. Special reading disability and mental defect have, to some extent, been differentiated in these cases where formerly the disability had usually been considered a special variant of mental defect. Their final reading status equals that of their peers who never were special reading disability cases. Some test as high as fifth or even sixth grade. Follow-up studies indicate that the reading ability thus acquired is retained and used after cessation of formal academic training and after parole to the community. Progress in reading very frequently is accompanied by a corresponding general classroom progress and by better adjustment. Last, but not least, the change in reading status takes place in approximately two years time, the rate of progress being comparable to that of a normal child in school. On the average, approximately 75 individual half-hour lessons are required. This means that in the course of a year a remedial teacher should be able to reach a classroom full of these children and initiate an improvement which will prevent further waste of effort and aid materially toward a rapid solution of their problems.

In the following we shall limit our discussion to a particularly significant aspect of this development, viz., the relationship between reading disability and maladjustment, and treatment of the disability as a therapeutic adjuvant. Although many workers of today who are concerned with reading disability and problem children are acutely aware of this relationship, we believe that the importance of the problem has not, as yet, been sufficiently recognized with reference to the mentally handicapped. The factors in the remedial treatment situation which presumably aid in personality education and adjustment would also seem to merit a brief discussion.

Admittedly there are cases whose adjustment is not noticeably affected by the special disability or its cure. They may have adjusted; or the reading defect may be, or have become, an insignificant factor in the picture of maladjustment. There are also

exceptional cases who, because of a personality problem, apparently do not respond to a direct remedial approach. We are not concerned with these cases in the present discussion. We have only those in mind in which the special reading disability is found to be a vital factor in the adjustment problems of the child. The majority of the special disability cases seem, however, to belong in this category. This is true even in the selected group of institutionalized mentally handicapped problem children studied by us.

The extreme reading case of the type in question enters adolescence without having made a significant progress in reading. We should note the educational maladjustment which is present in such a case. For six, eight or more years well intentioned ladies have, without success, attempted to teach such a child the basic academic subject. Being a case of special disability, he has a mental level which is significantly higher than his achievement level and he is intelligent enough to be aware of his inadequacy. He is quite likely to feel his disability as a reflection on his intelligence. Most of his friends have left him behind, not only in reading but frequently in other academic subjects as well. Reading is a tool subject, even in the special school. Measured in terms of grades this discrepancy between the reading case and his group may not seem significant. Measured in terms of futility of effort and feelings of failure his retardation is, however, extreme indeed. He has no occasion to seek consolation in the fact that from the standpoint of the high school the accomplishment in his group must also be classed as inadequate. The discrepancy between him and the group is sufficiently important to affect his placement and program; his disability is sufficiently marked to reflect itself in the attitudes of others and it is likely to affect his own attitude. Admittedly the adjustment problems are frequently also related to factors which lie outside the classroom situation, and the disability itself may at times have resulted, at least in part, from maladjustment or from factors which dispose to it. This does not lessen, however, the importance of the reading defect as an ever present stimulus to various types of maladjusted behavior.

Presumably the therapeutic effects of remedial reading do not, to a marked degree, depend upon the type of instructional program offered, provided the program is successful in teaching the pupil

to read. The therapeutic and educational values inherent in individual remedial treatment should, however, be emphasized, and, in the following, we shall have this situation especially in mind. More specifically we shall have in mind our own particular approach. During the crucial initial period this approach requires the pupil to face his problem squarely and he is guided from step to step by means of a carefully integrated selection of phonetic word drills.

The learning situation provides training in and release for basic adjustment processes. Avoidance reactions and compensatory reactions do not bring results and can be controlled. Reality must be faced. The pupil himself must solve his problem. He has a goal and must persist in order to attain it. Under the guidance of the teacher confidence is soon established. Persistence is rewarded from day to day through success and approval. The final result tends to bring the solution of a major conflict of long standing.

The transfer to other social situations may in part be accounted for by this solution of a conflict. Another point is the fact that the learning process implies, to a large extent, the "reconditioning" of attitudes and emotional responses. The organism or personality reacts as a whole to the learning situation. By a process of interaction involving the transfer of emotional reactions through association and substitution, a large number of social situations, persons, places, objects and their representations had become equivalent with one another and with the reading situation in eliciting maladjusted behavior. Speculatively one might say that the "reconditioning" referred to is the reverse process. The "reconditioning" is presumably dependent upon the fact that the disability had become a relatively important agent as compared with other sources of maladjusted behavior. If this condition does not hold, the linkage with other situations is presumably not sufficiently strong. The process of adjustment is greatly enhanced by the changes which gradually occur in the responses from the social environment and by the experience of success on a wider front.

We should finally also remember the teacher-pupil relationship which develops over a period of weeks and months during which time the pupil comes to the teacher almost daily for half an hour's individual training. The situation provides a setting in which the

shut-in and day dreaming child will open up and apply himself. It also satisfies the craving for attention and security common to so many of these cases while, at the same time, the danger of further "conditioning" the child unfavorably with reference to social behavior is reduced to a minimum. Attention seeking mechanisms tend to drop out almost automatically in the reading situation. Attention is focused not so much on the child as on an objective and significant task in which the teacher and pupil unite. The child grows up as learning progresses. When the treatment situation ceases to be functionally meaningful, the last remaining ties are usually severed painlessly.

In recent years we have published several reports on our results, including a number of case studies. Additional detailed reports are in preparation. We have studied the adjustment of our cases, both in the institution and in their subsequent life in the community. It has not been feasible to complete a satisfactory statistical analysis which will account for the importance of the treatment of the reading disability with reference to adjustment. There are, of course, always many factors in operation. But it is at least evident that many of our reading cases, who presented extreme adjustment problems at the time when they were taken for treatment, frequently adjust well and stay adjusted. The following cases are illustrative:

CASE 1.—Thomas, a negro boy, Stanford-Binet I. Q. 60, who at 14 years of age was a non-reader with a general educational age of seven years, five months. Thomas was a case of extreme aggressiveness and incorrigibility. He would go so far as to attack teachers and was a bully with younger boys and a fighter. Constantly attempting to remain in the limelight, and usually by objectionable behavior, he would, when ignored, "lapse into various states of emotion." When thwarted he would go into what was aptly termed "an insane rage," stabbing with a knife on several occasions. He has a good home and before admission his difficulties were, on the whole, confined to the school. A causative connection between learning difficulties and maladjustment is pretty well established in this case.

He was in the institution for half a year before remedial training began. In the course of the following two years and eight months, he reached the fourth grade level. His attitude toward the reading situation was at first markedly emotional; compensatory attitudes, refusals to cooperate, forgetting and breakdown of already acquired responses alternated with manifestations of a desire to learn and a naive and touching pride in minor successes. A turning point came after several months, and progress became rapid. There was a marked transfer to other academic subjects. Behavior gradually im-

proved so significantly that he was paroled at 16½ years of age. He was discharged two years later. For five years he has maintained himself rather successfully in the community under trying circumstances. He has a good job at Ford's. He possesses an excellent mechanical ability, and he builds and repairs radios in his spare time, making some extra money in this way. The radio is his absorbing interest. Tests a year after parole showed no decline in reading and general educational status. There has been a gradual rise in I. Q. from 60 to 67. The I. Q. may be higher at this time.*

CASE 2.—Leon is another negro boy. His father is serving a life term for having murdered Leon's mother, a fact known to the boy. The killing occurred when he was four months old. His only sibling, a brother, is in the state institution for the feebleminded.

Leon spent his early childhood with various members of his mother's family in an atmosphere of vice, crime and poverty. He was troublesome and not wanted. At five years of age he entered his first boarding home and in the following four years he was in ten homes, being unable to adjust in any. Before he was seven years old, he had been in the detention home six times because of vagrancy and objectionable behavior in public places. His failure to adjust in school was apparent from the moment he entered kindergarten, and he was referred for a clinical examination. In the following four years he was given three more examinations by different clinics. At nine he was admitted to the Wayne County Training School after all community resources had signally failed.

For three and one-half years he continued to be extremely troublesome. His problem was similar to that of Thomas, only more difficult. He was more vicious and would also indulge in most serious infantile tantrums, screaming, kicking and destroying property. In contrast with Leon, Thomas had manual ability and some arithmetic ability, and he has no family problem. When admitted, he was mature enough to respond to a constructive program. Leon, on the other hand, has had no accomplishment whatsoever to his credit, had been rejected everywhere, and has had no anchorage in the world. His conflicts go farther back. He was too immature to respond to any educational program. It should be mentioned, however, that he is quite responsive to affection.

The psychiatric social worker tried a program of frequent interviews. Emphasis was placed upon the exploration of old conflicts and the discussion of current difficulties. The attempt was made to establish a feeling of security by giving him exclusive attention and promoting a process of identification with the worker. He was made to accept some of the limitations to domineering behavior which are inherent in a social situation. Correspondence with his father and brother and contacts with an aunt were also arranged.

The worker finally referred him to the research department. He was invited to come in for a few hours each day. He had a room to himself, things

* The outlook continues good although his recent marriage to a low-grade girl, who had become pregnant by him, may affect his destiny unfavorably.

to own and play with, and friendly contacts and guidance. This program was futile because Leon could not really play. The drive for attention and dominance continued to govern his behavior. He did not want things and attention but the satisfaction of being given things upon request and of gaining attention. Refusals resulted in violent tantrums, and the program had to be discontinued.

Attempts to "recondition" him through removal from the group and deprivation of privileges have been equally unsuccessful. Such disciplinary actions had become the response sought, the occasion for a prolonged sequence of tantrums. Moreover, such rejection in his case is bound to elicit the old fear and rage responses and the method also has other limitations in extreme cases of this sort. It was necessary, however, to remove Leon from school in order to protect the peace of the classroom.

Thus we find him at 12½ years of age still the "wild boy" of the Wayne County Training School. His Stanford-Binet I. Q. is 67. Three months ago when he was taken for remedial training in reading his mental age was eight years, four months. This was considered a satisfactory basis for a training program although, being an all-round failure he is, strictly speaking, not a special reading disability case. We are reporting the case at this time because of its extreme nature and because of the highly interesting fact that Leon has responded very well to the remedial reading situation and to our special phonetic training method.

Naturally no predictions can be made. We merely state what is happening. His difficulties in learning are unusually great, but he is cooperative and much easier to handle than was Thomas. There have been no serious manifestations of maladjustment in the treatment situation. He is under control and he is able to focus attention upon the work. The ego drive is finding an outlet in a social channel. That he wants to learn to read is evident, and he is progressing. That behavior has been good in the cottage over a three month period, and that a program in swimming has been beneficial may or may not be significant. The response to the reading situation, however, certainly throws the appeal of this approach into striking relief.

The type of aggressive behavior described is perhaps especially deserving of attention because of its disturbing effects upon group life and because it so clearly suggests a future of delinquency. Several other problems are, however, equally important. For the present, suffice it to say that many of our mentally retarded reading cases had been characterized as unstable or neurotic without a clear realization of the psychological and educational pattern of special disability and its possibilities as a starting point for treatment. We have seen cases in which a definitely threatening psychosis was prevented with the aid of this approach. There are also those who, according to mental tests and other criteria, had been diagnosed as

socially inadequate by reason of mental defect, in other words as feebleminded, and whose status was materially changed.

High-grade defective and mentally handicapped children must be trained for life. Their potentialities must be explored. Their lives must be enriched by every possible means. They respond rapidly to individual help and to accomplishment. Maladjustment in their case is at least as serious from a social viewpoint as in normal children. It takes less to tip the scales in the wrong direction. It is our conclusion with reference to special reading disability in particular that it must be differentiated in these cases from the condition of general mental and educational deficiency and seized upon as a probably useful approach in preventing social inadequacy and in rehabilitating the maladjusted.

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DISCUSSION.

DR. LEO KANNER (Baltimore, Md.).—I feel somewhat ill at ease to be asked to comment on a subject at which both preceding speakers have made for themselves a deserved reputation as some of the foremost pioneers and experts. My only excuse for speaking at all is the fact that circumstances have brought it about that my clinic has become a sort of examination, treatment and teaching center for reading disability in the City of Baltimore. I am grateful to Dr. Hegge for having for years emphasized the fact that a relatively low I. Q. should not be made an excuse for neglecting the value of reading disabilities in those children. I may briefly point out three things that strike one in the discussion of reading disability.

The first is the relative newness of our knowledge of it. The first mention of it was made in 1887, the second in 1898, and then there was a long pause until 1917, when Hinchelwood in his book caught the attention of a wider public.

The second is the fact that even though since then many people, prominent among whom were the preceding speakers, have made major contributions to the subject, the reading disability is still unknown to a great number of school teachers, a great number of schools, and a great number of school systems.

The third is the fact that a great many children come to our attention whose reading disability as such is not discovered until they come for psychiatric examination because of behavior difficulties disturbing to the parents, disturbing to the school and, above all, disturbing to the children themselves.

We were surprised by the quick turn which the difficulties take for improvement as soon as the reading disability was discovered and something done about it. The experience of failure, the lack of knowledge as to the cause of failure, has certainly driven a number of children into manifestations which were disturbing, if not alarming. Compensatory boisterousness in school, truancy, enuresis, soiling even, could be helped as soon as the reading disabilities were found and treated.

Dr. Hegge's paper has brought out very beautifully the relationship between personality maladjustment and the existence and later correction of reading disabilities.

DR. JOSEPH ZUBIN (New York, N. Y.).—I should like to say a word about the rôle of prevention in reading disability, especially as applied to personality adjustment. I shall not say anything about such difficult cases as finally reach the psychiatrist, but in New York City about two years ago, the authorities

became concerned about the fact that as many as 100,000 term child repetitions occurred every year and 80 per cent of these were due primarily to reading disability, that is, failure to learn how to read in the first three grades. This represents a sum total expenditure of about $5,000,000 on these children, that is $50 a term. As a result, not only do they fail to learn how to read, but they help to swell the number of truants and eventually land in the courts as juvenile delinquents. The problem there was to see what could be done about it.

At a rather small expense, the WPA in New York, cooperating with the Board of Education, tried out a very simple experiment. It took relatively untrained teachers, teachers who hadn't even taught before, and simply by giving each child a chance to spend about an hour a day with the teacher who was untrained and unskilled in therapeutic methods and even in reading disability method of treatment, these five hours a week produced almost complete recovery from the reading disability in about 80 or 90 per cent of the cases. Apparently the bulk of the children who had been failing to learn how to read had done so not because of some superficial difficulty resulting from the fact that they were either a little hard of hearing or couldn't see so well or because the teacher didn't happen to appeal to them. It is along this road, I think, that the matter of prevention of reading disability lies. That is, do not wait until the child reaches a point where he needs a psychiatrist, but try to get teachers from the very beginning to prevent these cases by proper methods at the start.

DR. G. HEGGE (closing) (Northville, Mich.).—There was one point mentioned by Dr. Monroe that interested me a great deal, because it contained a viewpoint that I had previously heard her express. That was that the prognosis for improvement in behavior seems to be relatively poor in cases of long standing, in which the maladjustment and the disability had been in existence over a long period of time.

The fact is, our cases usually present that picture because of the special selection that occurs in their commitment to our institution. I presume there may be a hidden problem in that, perhaps apparent discrepancy in that Dr. Monroe thought primarily of children of higher intelligence and it is possible that the treatment of reading disability is likely to result more easily perhaps in some of our cases in adjustment than in the normal child whose disability has existed over a very long period of time. I think there is a possibility there.

SYMPOSIUM ON THERAPY INCLUDING HYPOGLYCEMIA.*

MAY 14, 1937.

PRESIDENT CAMPBELL.—We have this morning a symposium dealing with "Therapy Including Hypoglycemia." The first paper on "The Psychiatric Manifestations of Hypoglycemia" will be read by Dr. Edwin J. Kepler and Dr. Frederick P. Moersch of the Mayo Clinic. (Paper read by Dr. Moersch.)

THE PSYCHIATRIC MANIFESTATIONS OF HYPOGLYCEMIA.

BY EDWIN J. KEPLER, M. D.,
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AND
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The recent wave of enthusiasm in the treatment of schizophrenia by the so-called insulin shock therapy has as its main theme, the observation and evaluation of the mental reactions of the patient which result from the induced hypoglycemia. In addition, the insulin-shock therapy has afforded us an unusual opportunity to study the mental and nervous phenomena associated with hypoglycemia. It appeared to us that before we could clearly appreciate and evaluate the symptoms and results of insulin-shock therapy in cases of schizophrenia, we should review our records as to the mental symptoms associated with hypoglycemia, no matter what the etiology. It was with this thought in mind that our present study was undertaken.

For many decades it has been known or suspected that diabetes resulted from a deficiency of the intrinsic secretion of the pancreas. However, until about 15 years ago (Harris) little thought was devoted to the possibility that a clinical syndrome, the converse of

* The papers included in this symposium were read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

diabetes, might result from an overproduction of the intrinsic pancreatic secretion. Up to this time only a few authentic instances of low blood sugar had been encountered among human beings and to our knowledge there were no cases on record, in which a train of symptoms could be ascribed to the persistence of an inadequate amount of sugar in the blood. Today, we appreciate the existence of a syndrome as definite for hypoglycemia as for diabetes. It will be strange, indeed, if sooner or later, some bibliographer in his excursions into the archives of the past does not stumble upon a good description of hypoglycemia.

As the majority of symptoms that occur during the hypoglycemic attack are of a nervous or mental nature, it is important that the psychiatrist acquaint himself with the various mental phenomena occurring during the attack. This is especially important as there is no single criterion by which the state of hypoglycemia can be recognized. In a given case the symptoms may present themselves in strikingly different guises. The severity of the hypoglycemic symptoms is so variable that in the mild reactions the mental or nervous symptoms may be entirely overlooked or they may be interpreted as evidence of a psychoneurosis, vagotonia, a toxic condition or as a mild functional indisposition. If the hypoglycemic state is more profound, the mental reaction may be mistaken for an organic cerebral disease, such as alcoholism, organic dementia, encephalitis, paresis, tumor of the brain and so forth.

Etiology and Classification

Since the introduction of the term " hyperinsulinism " there has been an unfortunate tendency to attribute all hypoglycemic states to an excess of insulin in the body. However, in many instances the etiology is by no means so simple. The maintenance of a normal amount of sugar in the blood depends on an exceedingly complex mechanism of which the production of insulin by the pancreas is only one of the elements. Of equal if not greater importance is the liver. This organ is the source of the sugar in the blood and in its absence the sugar of the blood disappears. The rate at which sugar is metabolized by the muscles also affects the level of the blood sugar. Clinically, there is reason to suspect that the amount of sugar in the blood may be influenced by the rate at which sugar is con-

verted into fat. The centers in the brain stem also have an effect on the blood sugar. In addition, the concentration of blood sugar is influenced by the activity of the thyroid gland, the anterior and posterior lobes of the pituitary body, and both portions of the suprarenal glands. In diabetes the influence of all the factors just mentioned has been clearly demonstrated. Hypoglycemia, theoretically, might result from a disturbance in any of these factors and has been known to occur as a result of a disturbance in many of them. In short, the amount of sugar in the blood should be regarded as a trial balance of all the factors which lower or raise it. From what has been said it is apparent that until some of the fundamental problems of normal carbohydrate metabolism are clarified the etiology of hypoglycemia in some cases will remain obscure.

In general, the cases of hypoglycemia fall into two main groups: first, those in which the etiology can be established either before or after death, and, second, those in which the etiology cannot be determined either clinically or by examination at necropsy.* The classification in Table 1 which is based largely on cases we have observed personally, illustrates the complexity of the problem.

TABLE 1.

ETIOLOGIC CLASSIFICATION OF HYPOGLYCEMIC STATES.

I. Induced hypoglycemia.
   This occurs as the result of insulin therapy.

II. True hyperinsulinism.
   Due to tumors (benign and malignant) or hyperplasia of the islands of Langerhans. The hypoglycemia which occurs in the newborn children of diabetic mothers most likely belongs in this group.

III. Hepatogenous hypoglycemia.
   Examples have been encountered in cases of primary or metastatic carcinoma of the liver, fatty metamorphosis of the liver, cirrhosis, acute yellow atrophy, yellow fever, von Gierke's glycogen disease and in cases of poisoning by arsphenamine, carbon tetrachloride, hydrozene, and so forth. Fatal hypoglycemia occurs in animals after removal of the liver.

* The case recently reported by Baker and Lufkin is an excellent example of our inability to determine the etiology of the hypoglycemia in some instances. The patient had spontaneous hypoglycemic attacks for two and a half years. At necropsy no changes were observed which would account for the condition.

IV. Hypoglycemia from suprarenal or pituitary insufficiency.

Clinically, hypoglycemia is occasionally seen in destructive lesions of the suprarenal cortices (Addison's disease) or the anterior lobe of the pituitary body (chromophobe tumors, and so forth). It may occur in experimental animals after hypophysectomy or bilateral adrenalectomy.

V. Hypoglycemia of unknown etiology.

A considerable number of patients who have severe hypoglycemic attacks should be placed in this catagory. The term "hyperinsulinism" is a misnomer when applied to these conditions.

VI. Physiologic hypoglycemia.

This group is comprised of essentially normal individuals who occasionally experience mild hypoglycemic symptoms. Their symptoms are neither progressive nor disabling.

Pathologic Physiology.

Practically all of the symptoms of hypoglycemia can be interpreted as being the result of a disturbance in the nervous system. In decerebrate animals, convulsions continue to occur as the result of hypoglycemia but not after the medulla has been removed. Very little is known of the mechanism by which a subnormal value for the blood sugar produces its irritative or paralytic effects on the nervous system. Observations made on experimental animals, on patients suffering from spontaneous hypoglycemia and on diabetic patients treated both with regular insulin and protamin zinc insulinate indicate that the symptoms of hypoglycemia are dependent more on the rapidity of change in the concentration of the blood sugar than on the actual amount of sugar in the blood. Thus, a patient whose blood sugar has been lowered gradually may have no symptoms whatsoever. In one of our cases of diabetes in which the patient was treated with protamin zinc insulinate there were no symptoms whatsoever although the value for the sugar fluctuated between 28 and 42 mg. per 100 c. c. of blood for several hours. In another case in which the patient had a chromophobe tumor of the pituitary body there was a severe continuous hypoglycemia (30-40 mg. of sugar per 100 c. c. of blood) which was entirely asymptomatic. In this case the hypoglycemia was discovered accidentally in the course of a routine study of the blood chemistry. In some cases of diabetes in which the patients were treated with insulin and in hepatectomized animals, symptoms of hypoglycemia

may appear when the value for the blood sugar is at a normal level. Even granting that the hypoglycemic symptoms are the result of a sudden lowering of the blood sugar we are still in the dark as to how this shift alters the cells in the nervous system. Some observers believe that the symptoms are due to a lack of sugar in the cells (Olmsted and Logan); others are of the opinion that the phenomena are the result of an altered water metabolism (Drabkin and Ravdin). Anoxemia and parenchymatous disease of the nervous system are due to lactic acid and other mechanisms have also been invoked, but none of these theories is particularly satisfying.

There is reason to believe that some of the mild hypoglycemic symptoms are the result of the epinephrine liberated by the organism in its effort to mobilize sugar from the liver. Certainly, it is true that in induced insulin shock the early symptoms are comparable to those following a large dose of epinephrine. The fact remains that we know that certain definite symptoms occur during hypoglycemia, but as to their exact cause, we can only speculate.

With our increasing knowledge of hypoglycemia, evidence is accumulating to suggest that not only do transitory changes in the nervous system occur, but also that irreversible changes of a permanent character may possibly occur as the result of frequent and severe hypoglycemic reactions. This fact must be emphasized as in the treatment of schizophrenia by hypoglycemic shock, repeated severe comas are employed; it is not uncommon for a patient to be submitted to sixty or more comas within a relatively short period. Animal experimentation by many observers, including Stief and Tokay, Grayzel and others, have shown that, following severe hypoglycemia, definite pathologic changes, especially cellular changes both focal and diffuse occur in the central nervous system. These changes consist of areas of sclerotic nerve cells, zones of hyperchromatic changes in the cells and changes in the oligodendroglia and microglia. The changes in the cells appear to be most frequent in the third and fifth layers of the cortex.

Neuropathologic changes among human beings have also been reported by Wohlwill, Baker and Lufkin and others.[17] We have observed definite cellular changes in the cortex of two patients who died of hypoglycemia. The recent report of Baker and Lufkin

on the cerebral changes in cases in which the patients had had hypoglycemic attacks is of interest as the authors found numerous new and old hemorrhages scattered throughout the brain but they attributed the findings in the ganglion cells to postmortem changes. While the clinicopathologic picture is not complete, it is evident that we are dealing with a profound process that may produce changes which are beyond our control and which must be taken into consideration when considering insulin therapy of any type, especially where it is employed to produce frequent and severe comas.

Incidence.

Opinions differ regarding the incidence of spontaneous (pathologic or true) hypoglycemia.* According to some authors one might infer that the disease is almost as common as diabetes. On the other hand, among the first 18,000 patients who were admitted to one of the large Veterans' Administration Hospitals up to 1934 only one instance of hyperinsulinism was encountered and at The Mayo Clinic to date less than 30 patients have been treated for this condition. The difference between these two conflicting schools of thought probably is the result of difference in opinion regarding what constitutes pathologic hypoglycemia and the criteria used in diagnosis. In our opinion severe disabling pathologic hyploglycemia (regardless of its etiology) is a relatively rare condition, but because of its deceptive manifestations it probably occurs somewhat more often than it is recognized.

Hypoglycemic reactions occur with considerable frequency among patients treated with insulin. The reactions are usually mild and are generally recognized and treated by the patient. The reactions following the use of the recently introduced protamine insulin may be very bizarre and may be easily misinterpreted by the patient or physician.

Material for Study.

The material that we have had at our disposal for study was taken from the records of the clinic and from the records from the Rochester State Hospital. We have not included for this review

* The term "hyperinsulinism" is frequently used to include all such conditions.

cases of mild spontaneous hypoglycemia and the mild insulin reactions observed among diabetic patients. All our reported patients have had definite mental and nervous symptoms associated with their hypoglycemic attacks.

We have selected 21 cases of spontaneous hypoglycemia. Of these 21 cases, 9 were proved cases of hyperinsulinism, that is the patients had islet tumors of the pancreas; 12 cases belong to the group of spontaneous hypoglycemia of unknown origin; in 9 of these 12 cases the patients were submitted to abdominal exploration but no tumors of the pancreas were demonstrated. The remaining three patients refused operation. Of these 21 patients 15 were males and 6 were females. The ages of the patients ranged from 18 years to 57 years at the time the correct diagnosis was made. The average age at the time of diagnosis was 43 years. The average duration of symptoms prior to diagnosis was 3½ years. Three patients had had symptoms for 10 years prior to operation. One of these 3 patients had an islet tumor of the pancreas, the other 2 did not. In 7 of the 21 cases the mental symptoms predominated, in 6 the nervous symptoms predominated, but all patients had both mental and nervous manifestations. Six patients in this group had no convulsive attacks. The fasting value for the blood sugar or the value for the blood sugar at the time of the hypoglycemia ranged from 28 to 46 mg. per 100 c. c.

Twenty patients had induced hypoglycemic attacks of rather severe degree. Eight were patients who had diabetes and 12 were patients who were suffering from schizophrenia and insulin had been used as a therapeutic agent. In addition, we have included two cases of hepatogenic hypoglycemia and nine cases of moderately severe hypoglycemia in which the diagnosis could not be definitely established in spite of definite mental or nervous reactions. Four of the patients in the latter cases had convulsive attacks, one was operated on but no tumor of the pancreas was demonstrated.

Mental Symptoms.

In a consideration of the mental symptoms it is well to bear in mind that mental and nervous phenomena are a constant part of the hypoglycemic attack, indeed, at times they dominate the clinical picture. In spite of the many mental symptoms that may occur

during the hypoglycemic attacks there is no single psychic syndrome that in itself is characteristic of the condition. Rarely is the diagnosis of hypoglycemia easy and there is always a peculiar liability to designate the symptoms as neurotic (Jones) or attribute them to some condition other than hypoglycemia.

The psychic manifestations of hypoglycemia are essentially the same regardless of the underlying pathologic change. The severity of the symptoms appears to parallel the severity of the hypoglycemia, although there is a striking individual variation as to the patient's threshold of hypoglycemic sensitivity. Thus, one patient who has 50 mg. of sugar per 100 c. c. of blood will pass into coma while another patient will experience relatively little psychic disturbance when the value for the blood sugar is as low as 30 mg. per 100 c. c. In induced hypoglycemia, the symptoms as a whole are milder than they are in spontaneous hypoglycemia, as they are usually recognized and treated. The main exception is in cases in which schizophrenia is treated with insulin shock; in such cases the reactions may be very profound. On the whole, in a given case there is a tendency for the mental phenomena to follow a certain pattern, but the variations are at times so frequent and so striking that to accept such a statement as a rule might lead to grave errors in diagnosis and treatment.

It is exceedingly difficult to classify the numerous and sometimes bizarre mental phenomena encountered in the hypoglycemic state. The psychic symptoms extend over the entire range of psychiatric symptomatology. In attacks of any severity the attitude and general behavior of the patient are always disturbed. Any one of the following mental states, to mention only the more common ones, may dominate the clinical picture: apathy, irritability, restlessness, fatigue, anxiety, incorrigibility, negativism, automatic behavior, somnambulism, confusion, excitement, disorientation, "drunken behavior," fugue states, unconscious attacks, delirium, mania, stupor, coma. The motor activity may be decreased or increased. Speech is distorted; there may be garrulity, dysarthria or even aphasia. Emotional instability ranges from all forms of anxiousness to querulousness and violence. The character of the thinking becomes confused and sluggish; the patient may be delirious. The trend of thought may remain within reasonable bounds, but obsessions, compulsions and even hallucinations or delusions frequently may be

present. The mental grasp becomes distorted, the patient may become disoriented as to time, place and person. There is loss of memory for events and the patient does not remember the attack. The mental symptoms may be associated with neurologic disorders of varying type, as motor retardation or convulsive attacks of tonic or clonic type. Usually, it is the associated phenomena that occur during the hypoglycemic attack that must aid in making the diagnosis, as the mental picture taken by itself does not spell a positive syndrome. Unfortunately for the diagnostician, the associated phenomena may be wholly lacking and unless one's diagnostic acumen has been sensitized to the possibility of hypoglycemia the condition is likely to be overlooked. So true is this that on our diabetic service the resident physician is instructed to give orange juice to every diabetic patient who is taking insulin and who presents any bizarre or unusual symptoms, regardless of how improbable the possibility of hypoglycemia may seem.

Report of Cases.

The following cases have been selected because of their psychiatric interest. For the purposes of this paper, only the psychiatric features are presented.

Case 1. *Psychoneurosis Versus Hypoglycemia.*—A man, aged 42 years noticed that when he had changed from day to night work four years ago, increasing weakness and periods of mental cloudiness developed. Following a spell of faintness, his physician had found that the value for the blood sugar was 40 mg. per 100 c. c. Exploration of the pancreas in 1933 had not revealed any abnormality. Examination in 1936 had revealed many neurotic symptoms, but no evidence of hypoglycemia. Diagnosis: psychoneurosis. (A single low value for the blood sugar is not sufficient evidence for a diagnosis of hypoglycemia.)

Closely allied to this type of case are those cases in which patients have convulsive attacks as the presenting symptom. Rynearson and Moersch have previously pointed out that convulsive seizures are a very common neurologic accompaniment of a hypoglycemic attack. However, every hypoglycemic attack need not have convulsive manifestations as part of the syndrome and every convulsion need not be assumed to be on the basis of hypoglycemia, as after all, hypoglycemia is a relatively rare condition while convulsive seizures are very common and are due to many diverse causes.

CASE 2. *Epilepsy Versus Hypoglycemia.*—A girl, aged 19 years, had had grand and petit mal attacks for two years. The home physician found the value for the fasting blood sugar to be 83 mg. per 100 c. c. and a glucose tolerance test revealed that the value for the blood sugar was low at the two-hour period. A diagnosis of hyperinsulinism was made and an exploration of the pancreas advised. Examination at the clinic showed that the value for the blood sugar was within the normal range. Diagnosis: grand and petit mal (idiopathic epilepsy).

It is true, as pointed out by Nielsen and Eggleston and others, that in certain cases "epilepsy" is due to hypoglycemia and in every case of epilepsy this possibility should be kept in mind. This relationship is relatively rare and such a diagnosis should be made only after careful study.

The occurrence of psychic changes in cases in which diabetic patients have been treated with insulin is well recognized. Wilder related several interesting cases that belong in this category. In one case, a diabetic woman, "a person of mild manner, usually quite composed, easily pleased and polite came to see me one day indignant and quarrelsome over some minor annoyance. Her dosage of insulin proved to be excessive and she was most repentant the following day when her blood sugar had been permitted to rise to normal." Another of Wilder's patients, a diabetic, was a structural iron worker who, during one of his insulin reactions had descended without injury from the tenth floor of the steel frame of a building, and had no recollection afterward of how he managed to reach the ground. Another instructive case noted by Wilder was one in which a diabetic child was treated with insulin. The child did well in all classes in school except one. It was noted that this subject was taught in the late afternoon, at the time when hypoglycemia was most likely to occur. A light carbohydrate lunch given before this hour immediately improved the child's grades in this subject. At times, however, the mental phenomena present themselves in such an unusual manner that the underlying cause of the condition may be overlooked.

CASE 3. *Induced Hypoglycemia Versus Fugue State.*—A man, aged 21 years, had had severe diabetes for seven years. On two occasions he had had unconscious spells which had been associated with convulsive movements. For some time he had been lax about his diet and his use of insulin. On the evening in question, after he took his usual dose of insulin at 10 p. m., he went to his shack about a half mile from his home, where he was guarding

turkeys. The next thing that he recalled was waking up in the hospital the next morning at 10 o'clock. The father said that about 2 or 3 o'clock on the night in question, the patient arrived in the barnyard and went to the garage where his brother was asleep in a car. The brother was awakened by the opening of the car door which allowed him to slide more or less onto the ground. As the brother approached the patient, the patient started to fire at him with a revolver. The brother immediately changed his course and started for the house. The patient continued firing until he emptied the chambers of his gun. The patient then walked back to his shack. About five minutes after this period of excitement, the brother and father drove to the turkey shack and found the patient on his cot. He seemed dazed and confused and was put to bed. The next morning a physician removed him to the hospital because he was still confused; he remained in this condition until about 10 a. m. The patient insists that he has no recollection of any of these events. Diagnosis: induced hypoglycemia with fugue and amnesia.

Diabetic patients are all too frequently considered psychopathic because of recurring mental upsets when a reduction of insulin will remedy the condition. With our better understanding of insulin therapy in diabetes, severe hypoglycemic symptoms are less frequently encountered as both patient and physician are more alert to the insulin reactions. It must be borne in mind, as noted by Wilder, Jones and others, that a diabetic whose blood sugar has for some time been at a high level may show hypoglycemic symptoms when this level is reduced to what would ordinarily be a normal figure.

Bowen and Beck in 1933 reported a death resulting from insulin hypoglycemia. They said that up to that time Joslin had reported four deaths of diabetic patients who had severe insulin hypoglycemia. That hypoglycemia is not without danger is attested by various reports dealing with definite injuries to the nervous system.

*Case 4. *Severe Diabetes Followed by Spontaneous Hypoglycemia With Evidence of Damage to the Nervous System.*—A married woman, aged 43 years, had had severe diabetes for seven years. The diabetes had been difficult to treat because of alternating periods of resistance to insulin and periods of severe hypoglycemic symptoms induced by small amounts of insulin. Eventually, the administration of insulin had been discontinued; the glycosuria had ceased and spontaneous hypoglycemia had developed. She had had many and diverse reactions. An exploratory laparotomy, which had been performed in 1933, showed that the pancreas apparently was normal. The liver was small and cirrhotic. Microscopic examination of a section of the liver showed extensive fatty metamorphosis and slight portal cirrhosis. During 1935 and

*For detailed report of this case, see Judd, Kepler and Rynearson: Spontaneous hypoglycemia. Am. Jour. Surg. 24: 345-363 (May) 1934.

part of 1936 she had been in a state of hypoglycemia about half of the time. She once had been in hypoglycemic shock from 4 a. m. until well into the afternoon. Even when the value for the blood sugar was as high as 138 mg. per 100 c. c. she had failed to regain consciousness. On various occasions she had had motor palsies, convulsive seizures, a widespread peripheral neuritis, and on one occasion she had had a rather protracted attack of aphasia. In the course of time she had become mentally dull, irritable and seemingly showed evidence of mental deterioration. It was felt that she had sustained some damage to her central nervous system as a result of the hypoglycemic shocks. In recent months there has been some mental improvement, but there seems little doubt that some permanent damage has occurred in her cerebral function. Diagnosis: diabetes, severe hypoglycemic reactions associated with fatty changes in the liver and with apparent injury to the nervous system.

It is in spontaneous hypoglycemia, whether it is the result of hyperinsulinism or unknown causes, that the diagnosis of hypoglycemia may be overlooked, as there is little to direct the physician's attention to the hypoglycemia unless he is familiar with the syndrome of spontaneous hypoglycemia. We have previously called attention to the fact that the symptoms of hypoglycemia may erroneously be attributed to acute alcoholism. Frequently, our patients are advised to carry a slip of paper on which is written: "I am not drunk; I am sick. Make me drink orange juice if you can. If you can't, call a doctor." One of our patients, because of his unusual behavior, was considered to be repeatedly intoxicated, and was discharged from his work. Situations of this character have been noted by many observers. Naturally, such a diagnostic pitfall must be kept in mind when dealing with states of confusion or stupor. As Jordan has aptly said, "It is not seemly for a clergyman to appear intoxicated, and gossip lives on a frugal diet."

As a result of the bizarre and usually transitory character of the hypoglycemic attack, a diagnosis of hysteria is not uncommon, and as is frequently true once a diagnosis of hysteria is made, nothing short of a catastrophe or a miracle will change the diagnosis.

CASE 5. *Hysteria Versus Spontaneous Hypoglycemia.*—A man, aged 42 years, was accompanied to the clinic by his wife, who did most of the complaining. She said that for some months her husband had been having spells of two types. In one type of spell the patient had fallen to the ground, had resisted help, had kicked, had torn things up, had rolled about, but had not injured himself; there had not been a real convulsion. In the other type of spell he had become confused. He said that he felt fine but he did not seem to know where he was or what his business was. He spoke slowly and was unable to reason or to carry on an intelligent conversation. The unusual

character of the attacks led to the diagnosis of hysteria. Closer questioning revealed the fact that prior to the attacks he had had transitory spells of diplopia which strangely enough had disappeared when he had taken food. It was also noted that the attacks usually had appeared early in the morning, before breakfast, or when the patient had been very tired. The value for the fasting blood sugar was found to be 30 mg. per 100 c. c. Abdominal exploration did not reveal any tumor of the pancreas. As a result of a change in the diet, the attacks became less frequent. Diagnosis: spontaneous hypoglycemia with psychic manifestations.

The psychic manifestations during the hypoglycemic state may at times be very profound. Indeed, there may be violence which requires restraint or there may be deep coma. Harris, in 1933, reported a case in which a patient who had depression and delusions of persecution was saved from being committed to an institution by chance response to medical treatment. Wilder reported a case in which some somnambulism and delirium required restraint. He also called attention to the occurrence of psychoneurotic, schizophrenic and convulsive symptoms during hypoglycemia. Greenwood, of the Philadelphia General Hospital, reported several cases in which hypoglycemia was diagnosed as acute confusional states. He mentioned one patient, a man, who had been admitted to the hospital on three occasions with a diagnosis of alcoholic psychosis before the correct condition of spontaneous hypoglycemia was recognized. Similar cases have been reported by Jones, Carr, Wolfe and others.

CASE 6. *Somnambulism, Recurring Attacks of Acute Mania.*—A man, aged 47 years, had had spells of somnambulism for three years; he had wandered out of his apartment and had found himself in some neighboring building. On several occasions he had become irrational and because of a maniacal state had been confined in a straight jacket in a hospital. On one occasion he had been sent to the psychopathic ward of a hospital because of his "unreasonable conduct"; he had been rational during the day, but had had nightly episodes of confusion and delirium. Examination at the clinic revealed that the value for the fasting blood sugar was 35 mg. per 100 c. c. Abdominal exploration did not reveal any tumor of the pancreas. The patient's condition continued about the same as it had been. He died five years later and necropsy revealed an adenoma of the pancreas. Diagnosis: hyperinsulinism with attacks of somnambulism, confusion and acute mania.

Finally, there is a group of cases in which hypoglycemia is likely to be mistaken for organic diseases of the brain, such as tumor, paresis, cerebral vascular lesion, cerebral trauma and so

forth. In practically all these cases, when they are reviewed in the light of the correct diagnosis, the diagnosis appears to be relatively simple. But, as is usually the case, the patients present themselves to the physician under such unusual circumstances that unless the possibility of hypoglycemia is thought of the condition is not recognized.

CASE 7. *Convulsive Attacks, Suspected Tumor of the Brain.*—A man, aged 46 years, was sent to the clinic because of a diagnosis of possible tumor of the brain. Five months previously he had had a generalized convulsion. Since then he had had frequent lapses of memory. A week prior to his admission to the clinic, he had had a more protracted spell of confusion in which he had washed himself in a bucket of drinking water and had completed his ablutions with a pitcher of cream. In spite of the fact that neurologic examination did not disclose any abnormality the possibility of a tumor of the frontal lobe was considered and an encephalographic study was carried out. The results of this examination were negative and the patient returned home. The condition of the patient remained practically the same for about a year and a half, when his physician wrote that he had witnessed a convulsive attack. "The attack he was having was not like any epileptic attack that I have ever seen." The patient was advised to return to the clinic. As a result of a history of frequent spells of confusion that had occurred in the morning and a value of 35 mg. per 100 c. c. for the fasting blood sugar, the diagnosis was relatively easy. Abdominal exploration revealed an adenoma of the pancreas. When the patient was dismissed from the hospital the value for the fasting blood sugar was normal and to date the patient has had no further attacks. Diagnosis: hyperinsulinism with convulsive attacks and spells of confusion.

Other striking examples of psychic disturbances during hypoglycemia could be reported, but these should suffice to call attention to the variable symptomatology of the hypoglycemic attack.

INDUCED INSULIN HYPOGLYCEMIA IN SCHIZOPHRENIA.

Up to the present time (May 8, 1937), we have observed 13 schizophrenic patients under insulin shock therapy. During this time we have observed the mental and nervous reactions during approximately 350 deep comas. It is difficult to compare accurately the psychic phenomena of the mentally normal individual with those of the schizophrenic patient, but it may be said that in a general way practically all the phenomena that are observed in insulin-induced hypoglycemia in diabetes and in spontaneous hypoglycemia are to be observed in the schizophrenic patient. Thus far, we have encountered no evidence of permanent cerebral damage among our

schizophrenic patients. Some permanent cerebral changes have been reported in cases in which the hypoglycemic shock treatment of schizophrenia has been employed and also in cases of spontaneous hypoglycemia. These changes merit a more extensive pathologic report, but attention should be called to the possibility that severe, prolonged and repeated hypoglycemia may result in serious injury to the central nervous system.

As a rule, in the cases of schizophrenia that we have observed, the first symptom of hypoglycemia is increasing drowsiness. This is followed in the majority of cases by a variable degree of motor and psychic excitement, which is comparable to the states of confusion noted in the mentally normal hypoglycemic patients. The period of excitement gives way to coma. Some patients do not experience the stage of excitement, but quietly pass into the state of coma. Some of the more lucid patients said that they seem to be overtaken by a sense of intoxication, or "poisoning" which causes them to pass gradually into oblivion and which leaves them without any memory of the period of coma.

During the coma, many phenomena are observed, such as profuse perspiration, salivation, and motor phenomena of variable degree and pattern. There is a tendency for the symptoms in each case to follow a certain pattern, but psychic variations may occur from time to time. Several patients, while reviving from their coma, would be lucid for several minutes and then resume their usual mental state. This is not unlike the somnambulistic or fugue state seen in other hypoglycemic reactions. We have also observed that following the shock therapy, the mental reaction may change from that of a catatonic stupor to one of catatonic excitement. We have not been able to discover in the motor disturbances of our schizophrenic patients any of the anatomicophysiologic reactions described by Sakel and Angyal and others.

As a result of our experience with these thirteen patients, we have learned that the hypoglycemic reactions in schizophrenia are essentially similar to those observed in patients who are mentally normal, but thus far our studies have contributed only little to a clearer understanding of the effects of hypoglycemia on the nervous system or a better understanding of the mechanism of dementia præcox.

Diagnosis.

The diagnosis of hypoglycemia as the cause of psychic disturbances is not always easy. There are certain cardinal factors associated with hypoglycemia that should at least arouse one's suspicion as to the presence of the condition. These cardinal factors may be summarized as follows: (1) the clinical picture is predominantly one of periodic neurologic or psychiatric episodes; (2) the varying phenomena may present themselves in bizarre form and are usually of a transitory nature, although often of violent character: (3) there is a tendency for the symptoms to occur at certain periods, usually when the patient is hungry or after exertion; (4) the patients appear well between the attacks; (5) the value for the fasting blood sugar or that for the blood sugar during the course of the attack is low; and (6) complete relief from symptoms follows the administration of dextrose.

Before a positive diagnosis of hypoglycemic attacks can be made in a case in which a patient is not taking insulin, it is necessary to show: (1) that the attacks can be precipitated by abstinence from food, (2) that the attacks are associated with a subnormal value for the blood sugar,* and (3) that the ingestion of dextrose will relieve the symptoms. In many instances it is easy to satisfy these requirements. Occasionally, it is very difficult, as the value for the blood sugar after a fast of 12 hours may be normal in some cases in which patients are suffering from bona fide hypoglycemic attacks. If there is good reason, from the clinical history, to suspect hypoglycemia, an effort should be made to induce an attack by exercise and the withholding of food. In one of our proved cases it was necessary for the patient to fast more than 24 hours before an attack could be produced by exercise. It is our opinion that a diagnosis of hypoglycemia should never be made solely on the interpretation of a glucose tolerance curve. Not infrequently, patients suffering from true hypoglycemic episodes have glucose tolerance curves which are frankly diabetic in character, and, conversely, some normal persons have low values for the blood sugar three hours after the giving of dextrose to obtain a tolerance curve. In

* Opinions differ regarding the lower limit of the normal concentration of the blood sugar. In unequivocal cases of hypoglycemia the value for the blood sugar during an attack is practically always less than 55 mg. per 100 c. c.

the latter instances the hypoglycemia (which is rarely of a severe degree) is probably purely physiologic in character. Diagnoses of hypoglycemia are frequently made in cases of gastro-intestinal neurosis, duodenal ulcer, vagotonia, or anxiety neurosis, because of the presence of spells of fatigue which are associated with hunger or mental apathy and are relieved by the ingestion of food. Such a diagnosis in the absence of the criteria just enumerated is not justified. It is this tendency to make a diagnosis of hypoglycemia without adequate foundation that has led to the recent frequent reports in the literature of large numbers of cases of hypoglycemia. Undoubtedly, a great share of these patients are not hypoglycemic, but have functional disorders.

It is of interest to review the various early diagnoses that had been made in the 21 cases with spontaneous hypoglycemia. In most instances, more than one diagnosis had been made in a given case before the correct diagnosis was made. The following are some of the early diagnoses which had been made in these cases: unconscious attacks with or without convulsive features in fifteen cases; acute confusional state in eight cases; stupor or coma in four cases; spells of weakness in four cases; intoxication (alcohol) in three cases; spells of vertigo or dizziness in three cases; tumor of the brain in three cases (an encephalogram had been made in one case); hysteric spells in two cases; acute delirium or mania in two cases; spells of amnesia in two cases; epilepsy (as only diagnosis) in two cases; and lethargy (encephalitis) in one case. It is not surprising that the majority of the early diagnoses were of a descriptive nature. The physicians appreciated that they were dealing with unusual phenomena that did not appear to conform to any of the customary syndromes. Very rarely was the correct diagnosis suspected in the early stages of the disease. Not infrequently, the patient or the family directed attention to the correct diagnosis by their observations as to the time of occurrence of the attack and the knowledge that food relieved the symptoms. By the time the patients were examined at the clinic the diagnoses had grouped themselves as follows: hypoglycemia in ten cases; tumor of the brain in four cases (a ventriculogram had been made in one case and an encephalogram in another); spells of weakness in two cases; spells of stupor or coma in two cases; hysteria in one case; convulsion in one case and a cerebrovascular lesion in one case.

A consideration of the differential diagnosis of hypoglycemia in relationship to the psychic manifestations covers a wide range of conditions. Space will permit mentioning only some of the more common conditions that may be confused with hypoglycemic states. These are functional disorders, especially hysteric attacks; acute alcoholism and drug intoxication; acute confusional states, as fugues, somnambulism, delirium and mania; mild depressive reactions; states of stupor or coma (diabetes and uremia); organic cerebral diseases, as tumor, encephalitis, paresis, cerebrovascular diseases, narcolepsy, and various other organic conditions which produce mental and nervous phenomena as part of their clinical syndrome. It is beyond the province of this paper to consider the differential diagnosis of the various diseases that produce hypoglycemia. If the neurologist or psychiatrist will become "hypoglycemia conscious" he will recognize a hypoglycemic episode when he encounters one or will suspect such a possibility when he evaluates the history of a patient who has had such attacks.

Treatment.

As dramatic and as profound as the mental symptoms of a hypoglycemic attack may be, just so dramatic may be the response to treatment in a given attack. As Carr has said, there is "a surprising and somewhat mysterious tendency toward recovery after the attack has fully developed." There appears to be comparatively little danger of a fatal termination as a result of an isolated severe hypoglycemic attack. The marvel is that a patient in profound shock, in an acute mania or in severe convulsions and who seems on the point of death, may within 10 or 15 minutes get up and eat a hearty meal while engaging in a cheerful conversation, and be entirely oblivious of the apparently precarious state of a few minutes previously. The treatment of the isolated attack consists in the administration of dextrose which is almost uniformly effective. Very rarely one may encounter cases in which the symptoms are not relieved for a long period after the value for the blood sugar has been elevated to normal. The prevention of the attack is more difficult. If the attacks are due to induced insulin hypoglycemia an adjustment in the insulin therapy may obviate further trouble. In spontaneous hypoglycemia, the problem is different.

In most instances it is impossible to determine clinically the organ responsible for the subnormal value for the blood sugar. Consequently, if the symptoms are disabling, a surgical exploration of the pancreas is usually indicated. The results are exceedingly satisfactory if an islet tumor of the pancreas is found and removed successfully. Some of these tumors are malignant and an early operation offers the only chance for cure. Prolonged medical treatment with frequent feedings is inadvisable unless it can be shown definitely that the cause of the disease is not in the pancreas. Such treatment almost invariably brings about great increase in weight and consequently increases the hazards of operation.

Unfortunately, in an appreciable number of cases no tumor of the pancreas will be found at the time of operation. Occasionally, in such cases good therapeutic results have followed partial resection of the pancreas, but in many instances the course of the disease is not influenced by this procedure. Medical treatment then has to be resorted to. As a rule this is not very satisfactory. Drug therapy generally is of little help. Low carbohydrate and high fat diets have been reported to be of value, but as a rule patients who have severe symptoms have to be treated with frequent feedings of carbohydrates.

Summary

It is important for the psychiatrist to appreciate fully the protean nature of hypoglycemic episodes. Invariably, the hypoglycemic attack is characterized by some psychiatric phenomena and indeed the mental symptoms may dominate the clinical picture. As has been pointed out by Allan and others,[18] the psychiatrist is frequently called on to render an opinion in cases in which there are bizarre or unusual mental phenomena and he should be "hypoglycemia conscious." There are three major groups of hypoglycemia, (1) that due to injections of insulin, (2) that due to organic pathologic changes in the pancreas or other organs, and (3) that due to unknown causes. The condition is most prevalent in middle life and probably is not as common as was formerly suspected. In our series of 21 cases of noninduced hypoglycemia, nine were proved to be due to islet tumors of the pancreas and operation offered the only hope of improvement, nine patients were operated on

but no islet tumor was demonstrated; the etiology in most of these cases was indeterminate. The diagnosis of hypoglycemia may be relatively simple if the cardinal factors of the condition are kept in mind. At times, however, the diagnosis may be exceedingly difficult. This is true as all too frequently the patient presents himself for diagnosis under such unusual or trying situations that the neurologist or psychiatrist, unless he is hypoglycemia conscious, will attempt to explain the findings on the basis of some neurologic or psychiatric disorder. The diagnosis of hypoglycemia is usually made early in the disease, although at times eight to ten years may elapse before the nature of the condition is recognized. The symptoms of hypoglycemia may range from mild apathy to mania or coma; there is no single mental syndrome that is pathognomonic of the condition. As important as a low value for the fasting blood sugar may be, a single low value for the blood sugar does not in itself prove that the symptoms are hypoglycemic in origin.

The exact mechanism by which hypoglycemia produces its effects on the nervous system is not known. In our treatment of 13 patients who had schizophrenia we have been able to observe the mental and nervous phenomena during approximately 350 deep comas. Profound changes in cerebral functions occur during hypoglycemia and the possibility that hypoglycemia may produce pathologic changes in the central nervous system should be appreciated. Thus far, we have encountered no ill effects from the use of insulin-shock therapy in schizophrenia.

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PRESIDENT CAMPBELL.—When there is a path, to follow it is comparatively easy. To blaze a trail through a practically uncharted region is difficult. In therapeutics many of us utilize methods without thinking very much of the pioneer who outlined these methods. We are at present in a phase of very great interest. We have a path being blazed in a territory which is of the greatest importance. We are very fortunate in having with us today the pioneer to whom we owe a new method of treatment and who has courageously, for a considerable period, carried on this method of treatment. I shall ask Dr. Manfred Sakel of Vienna, Austria, to address us on "The Methodical Use of Hypoglycæmia in the Treatment of Psychoses."

THE METHODICAL USE OF HYPOGLYCEMIA IN THE TREATMENT OF PSYCHOSES.*

By MANFRED SAKEL, M. D., Vienna, Austria.

The American literature has lately contained reports of the therapeutic results and possibilities of the methodical use of hypoglycemia in the treatment of psychoses; it is nevertheless understandable that serious and critical scientists still wait to be convinced, and continue to retain a cautious attitude toward this new therapy. It is not only because an inadequate number of confirmatory reports of the value or soundness of the treatment have so far appeared. I think there are other reasons that could be given and before I proceed to the real subject of this talk, namely the origin and theoretical basis of this therapy, I think it would be well to discuss briefly these other reasons for the prevalence of an attitude of cautious scepticism.

The instinctively cautious attitude adopted by the profession toward this special kind of therapeutic procedure is due to the fact that the basic idea behind it is fundamentally at variance with the biological principles which are ordinarily involved in other therapeutic procedures. The great advances in treatment made by modern medicine in recent years have taught us to expect that every successful treatment has to be based on sound biological principles: a treatment has to fit somehow into the physiological processes with which we are already acquainted. A treatment ought either to eliminate some recognized functional disturbance in the physiological mechanism, or else destroy the actual causative agent of a disease—an infectious agent, for example, can be made innocuous by certain medicines, or a recognized poison, which disturbs the normal physiological processes can be eliminated or neutralized in some way. Modern therapy in recent years has developed consistently along such lines, and even the fever therapy, for example, was neither an unexpected nor an illogical development. When Wag-

* From the Harlem Valley State Hospital, Wingdale, N. Y. Translated from the German by Joseph Wortis, M. D.

ner-Jauregg so brilliantly called the attention of the medical profession to the therapeutic effect of fever, physicians could recall instances in their own clinical experience when one or another psychotic subject was helped or cured by an attack of fever. It was not difficult to come to realize that fever was not a meaningless accompaniment of the organism's struggle against some toxin, but was instead an essential and perhaps indispensable part of the organism's defenses. The discipline of modern science nowadays demands that the first step in the development of a treatment is either to find the toxin that causes the disease, or else to discover what constitutional or functional disturbance is responsible for the symptoms of the disease. It is clear that when a science such as medicine has reached its present high degree of scientific objectivity, there is no room for therapeutic mysticism, or for anything which even suggests it.

Now, how does the hypoglycemic treatment of the psychoses fit into this picture? Does it stand in any kind of analogous relation to the kind of biological or physiological principles we have just mentioned? No, it certainly does not. And this is precisely the difference, which I have just attempted to describe, which all strictly scientifically minded physicians must feel, consciously or unconsciously, in regard to this treatment. But it is nevertheless justifiable to allow an exception in the case of the hypoglycemic treatment, for it has a special and unique position and should not be measured by ordinary standards. This must be so because the fundamental fact is that we do not know the nature of underlying processes of the disease called schizophrenia. In fact, it is still a debatable question whether we are dealing with a disease entity in the ordinary sense at all or simply with a symptomatic clinical picture. And we not only know nothing of the schizophrenic process and schizophrenic diseases, but we know nothing either about the conditions or processes involved in normal thinking, to say nothing of the complicated process that must be involved in an hallucination or delusion.

When we consider our experiences with the hypoglycemic treatment, and more particularly with the hypoglycemic state itself I think we can now say without much fear of contradiction that psychological factors are not likely to be the only ones involved in a mental dislocation as serious as that found in schizophrenia. There

must be some injury to the deeper vital processes as well, perhaps a pathophysiological disturbance, or something perhaps even more complicated. We cannot however dispense with the psychological analysis and understanding of the delusions. There is no substitute for a thorough analysis of the delusions, for that is the only way we can begin to understand the complexes and difficulties of our patient. These problems and preoccupations are merely distorted and transformed by the disease process before appearing in the delusions, but by understanding them, we are enabled to diminish their force and thus relieve the patient.

I have a high regard for strict scientific procedure, and would be glad if we could follow the accustomed path in solving this special problem: it would have been preferable to have been able to trace the cause of the disease first, and then to follow the path by looking for a suitable treatment. But since it has so happened that we by chance hit upon the wrong end of the right path, shall we undertake to leave it before better alternatives present themselves? For even if the hypoglycemic treatment of psychoses accomplishes only a part of what it promises, it nevertheless has a value beyond its therapeutic claims, for it should perhaps now enable us to work backwards from it to the nature and cause of schizophrenia itself.

I am aware that this may prove to be a larger and more difficult undertaking, but I believe it can be said that it is well worth the effort, even though my own theoretical premises, on which the treatment has been based, should finally prove to be wrong. The mistakes in theory should not be counted against the treatment itself, which seems to be accomplishing more than the theory behind it.

The working hypothesis is schematic. The scheme involves a picture of the biological processes and activity of the nerve cell itself, about which we actually know nothing, in contrast to our extensive knowledge of the anatomy, histology and functional localization of modern neurology. The working hypothesis is based on the assumption that the nerve cell is functionally comparable to a fuel engine, so that each of its various functions may be placed in analogy to the functions of such an engine. The nerve cell in other words, like an engine, must have a certain potential energy comparable to that of a running engine that is disengaged. Further-

more the nerve cell, if it is to retain this potential energy, must depend on a continuous supply of endogenous excitant material, comparable to the engine's fuel. Every individual has his own normal nerve cell functional capacity or state of tension, which is sustained by a corresponding amount of excitant hormones. The intensity of potential energy of the nerve cell depends on the proportional mixture of excitant and inhibiting hormones. The level which is normal for each individual is sustained by an automatic regulation. Should the automatic regulation be disturbed by some disease process, then an excess of excitant hormone in the mixture —like too much gas in a motor—can cause an overactivity and therefore a pathological activity of the cell. If the inhibitory factors dominate, then the reaction is weaker, like that of a motor with too little gas. The continuation of the normal tonus of the nerve cell is, in other words, conditioned like the activity of a fuel engine, by both the amount of gas or fuel, and by the kind of regulation. I at first applied this schema to the abstinence symptoms of morphinists. The symptoms that an abstinent morphinist displayed seemed to me to be not primarily but rather secondarily psychological, with the real origin in the vegetative sphere. Since most of the physical symptoms resembled the symptoms of a severe Grave's disease, I concluded that there must be an overstimulation of the sympathetic part of the vegetative nervous system. The sudden onset of the symptoms and their inevitable spontaneous disappearance without treatment in a few days led me to believe that the stimulation of the vegetative nervous system was due to some pathological change in the nerve cell rather than an excess of the excitant hormone, such as we know exists in Grave's disease. I thought that the nerve cell, because of some pathological change, was able to attract more of the circulatory excitant hormone than it usually does. In order to visualize this sudden and transitory affinity of the nerve cell for the excitant hormone, I assumed that the nerve cell was changed by the morphine and that it acquired, to use another figure, additional valences in this way. Let us assume that the normal nerve cell has two valences which have to be saturated with the excitant hormone in order to preserve a normal tonus. If moderate amounts of morphine are administered then one of the valences, having an equal affinity for morphine, becomes

saturated with morphine instead of with the excitant hormone and the result is an abnormal relaxation of the cell. If still more morphine is administered the cell must be stimulated to produce new valences in order to preserve its tone. If, for example, another valence is produced, then there are again two valences which can be saturated with the excitant hormone, so that in spite of the morphine there is no abnormal relaxation of the cell. That is why the morphinist has to keep increasing the dose. This process can repeat itself indefinitely.

The function of the insulin in this abstinence treatment is on the one hand to neutralize the excitant material, and on the other, to cover the unsaturated valences. The success of the treatment with morphinists readily suggested the possibility of using a non-alkaloid to pacify the nerve cell in other excited states. The working hypothesis was up to now proving serviceable.

While using these moderate doses of insulin, it was observed clinically that certain mental or even characterological changes accidentally appeared in certain patients. The assumption of a simply quantitative diminution of cellular function could no longer explain these changes. As such clinical observations were repeated, they could no longer be regarded as accidents but had to be related intimately to the hypoglycemia. Observations like the following could not be overlooked: Patients of an extreme egoism, with an egocentric attitude verging on autism, would become extroverted after an accidental hypoglycemic shock and would become extremely accessible and friendly. This even occurred quite frequently during the first days of abstinence when we were accustomed to see the patients, who were usually quite psychopathic to begin with, become even more asocial than ever.

The fact that stubbornly fixated psychotic character anomalies could be relieved during hypoglycemia and the observation that the rigidity of the personality could be relaxed, sometimes for a sustained period, all led me to think of the possibility of using hypoglycemia as such in the treatment of the psychoses.

I shall later have occasion to talk of the development of the method which made it possible to reach this goal. But for the present I wish to sketch briefly the working hypothesis which guided me in varying the method in different psychotic states.

The assumption that insulin diminished the activity of the nerve cell was sufficient explanation of the sedative effect on excited states but did not serve to explain the mental changes during and after hypoglycemia. The schematic picture which helped me to explain these phenomena was the following:

Activity in the sphere of the nervous system always consists of reactions to stimuli which flow in certain pathways. The changes occurring during hypoglycemia could be explained by the assumption that the hypoglycemia blockades the pathways which happen to be most active at a given time, so that the reactions to the same stimuli now come through pathways which had previously been inactive.

In order to make this picture clear I will take the example of a unicellular organism: Every reaction in this organism too must be regarded as a response to a stimulus, and each cellular function is induced by a signal or stimulus. Each different reaction is dependent on the nature of the stimulus, and both reaction and stimulus are appropriate to each other. In order that this may be possible it is necessary that the whole course of the reaction, from the point of entry of the stimulus to the final end effect, should run through the appropriate intracellular pathway. The more primitive the cell, the fewer the possible varieties of reaction, and the fewer appropriate pathways there must be. At a higher level of development, as new varieties of reaction appear, it becomes necessary for new pathways to develop. When this happens, those pathways which are older in the evolutionary scale are overshadowed by the new pathways that develop and the former fall into the background. In multicellular organisms it becomes necessary to transmit stimuli from one cell to another along fixed pathways in order to allow a given functional activity. At any one stage of development these intracellular pathways are specialized and fixated, and insure a precise performance of the most complicated functions in response to appropriate stimuli, and of course the thinking process is such a function. A stimulus can provoke a reaction only when the stimulus is applied at the appropriate pathway, but not when it is applied to another. If an inapproriate stimulus reaches a certain pathway, it provokes no reaction; a sound wave, for example, produces no reaction on the optic nerve. In the course of long periods of evolution, the course of reactions and the responses to stimuli

become more complicated. The stimuli themselves change in time too—so that it becomes necessary for new pathways to develop. The more ancient pathways sink into the background, but the appropriate relation between stimulus and nerve pathway continues. The most recent pathways to develop are therefore the youngest in the evolutionary scale, and are at the same time the most complicated pathways and those most frequently used.

We know from experience that the youngest and most active organs are most sensitive to injury, and this applies to the nerve pathways. Whenever the nerve cell is injured by some disease process in the organism, either qualtitative or quantitative changes may occur. Qualitative injury to the nerve cell causes injury to the youngest pathways first of all, just as the most recently developed organs in the body are the first to respond to injury. The more severe the injury, the older the pathways are which become involved. The result is that the older pathways must again be activated, and the reactions to stimuli again run across these older pathways. If the injury is very violent there is a distortion and confusion of the intracellular pathways. The former change becomes apparent in the patient's primitive attitude toward the outside world, the latter change manifests itself in the patients disorientation and disorganization. By a process of short circuiting, inappropriate pathways and reactions are involved in the response to given stimuli. A stimulus for example instead of producing a reaction along its appropriate pathway, by means of a short circuit induces reactions over another or several other afferent or efferent pathways. Thus a response may take place over a false pathway by means of a short circuit in spite of the absence of the appropriate stimulus, so that a false sensation is experienced. An olfactory stimulus for example may at the same time, because of a short circuit, induce reactions along both acoustic and visual pathways. This represents the schematic picture of the nature of hallucinations in psychotics, developed from observations on the effect of hypoglycemia on hallucinations.

A clinical example:

A patient who had been having auditory hallucinations for decades, and who had developed a whole delusional system, was subjected to treatment. In four weeks the shock dose was reached. During hypoglycemia, just before the development of coma, the hallucinations disappeared completely for about an

hour. After further treatment the hallucinations not only disappeared for an hour before the onset of coma, but also for another three hours after the termination of hypoglycemia. The patient meanwhile had no physical complaints whatever. This transitory disappearance of the hallucinations was not due to any change in environment or to any physical disturbance, as the following experience shows: For the first few days the patient explained the disappearance of the hallucinations by saying that his enemy was being kept away from him. Later, as he began to observe that the hallucinations disappeared regularly during and immediately after the hypoglycemia, he concluded himself, without any suggestion from others, that "It must be due to some change in me, when those voices disappear during the treatments. It can't be due to something that is being done to my enemy."

I would not call that insight, for the patient's paranoia had lasted too many years for that, but it was interesting to observe the conflict between the paranoid attitude which he could not abandon, and his attempt at a logical solution of the facts.

The following case shows that there are no elements of suggestion or physical change involved in the disappearance of the hallucinations during and after hypoglycemia even in the transitory reactions.

A female patient who presented a picture of paranoid schizophrenia for about a year, associated with purely auditory hallucinations, lost her auditory hallucinations completely after four weeks of hypoglycemic treatment in spite of the fact that she had not yet recovered. She showed no insight, spoke of her hallucinations as of a simple fact, but talked of them in the past tense. She said for example: "I am healthy again, I can go back to my job in Washington. You know that it's been said on the radio that my job is being held for me. You can hear it too." When the examiner paused as if to listen a moment and then said: "No, I don't hear anything. What do you hear?" the patient listened intently for a minute and then said: "Yes, I don't hear anything now either. I haven't heard it for the past few days but it's true anyway."

I shall now only give a short example involving visual hallucinations.

A young girl who had been in the hospital for a few months with a whole system of bizarre delusions which we cannot discuss at present, kept seeing designs, letters and figures on her arm which she imagined that her supposed husband had tattooed there by remote control. She experienced her first shock about 16 days after treatment started and her visual hallucinations thereupon disappeared. When asked again that day, "What about those draw-

ings on your arm?" She thought a while and said: "I think my sight is getting bad, I can't see them now. I've got to give my eyes a rest and then I'll see them again." After her hypoglycemic state was terminated the hallucinations again reappeared but would disappear thereafter during each hypoglycemic treatment for longer and longer periods, and finally disappeared completely. But it still took some time before the patient could look back and appreciate the fact that these delusions were not real.

In all of the examples which I have just given it seems that the hypoglycemia had disconnected the most recent pathways and isolated the short circuits, and thus prevented the false discharge of reactions from appropriate pathways to inappropriate ones. After further manipulation of the hypoglycemic treatment it was possible to blockade and isolate the short circuited pathways so that finally the reactions to stimuli traveled exclusively over appropriate pathways. This picture of the mechanism involved in hallucinations is again merely meant to be schematic.

It is much more difficult to apply this scheme to the abstract and intangible problems involved in the processes of thought or of consciousness. At the risk of getting involved in mythology, the absence of any other helpful picture obliges us to resort again to an hypothesis which will enable us to explain the effect of hypoglycemia on the purely mental processes of thought. We should picture these processes as involving separate cellular units analogous to those of our previous working hypothesis, and these units are again related to different stages of development. To justify, but not to prove, this assumption I shall start with the more concrete and easily observable neurological analogies: I refer to the disappearance of the various reflexes during hypoglycemia and coma in the order of their evolutionary development, as well as the reappearance of these reflexes in reverse order. It cannot be overlooked that the first organic functions to be eliminated are those which are phylogenetically and ontogenetically most recent, with these followed in turn by the older and older ones in regular order. The cremasteric reflex for example disappears first, a Babinski appears at the first sign of coma, while the corneal reflex—which is more ancient—remains active longest, remains in other words most resistant to the hypoglycemia. Similarly, all the other functions are put out of action, layer by layer, as coma deepens and grows more prolonged, with the respiratory center last to be involved. The

temperature center, which I may call a more recent development, is involved earlier. When hypoglycemia is terminated and normal relations are again revived, the first centers to respond are again the older and more resistant ones, for example, respiration, temperature, then the older corneal reflex as the first reflex, the Babinski much later, etc. The special sensitivity of everything that is of more recent development, more complicated and more dominant, is also revealed by the fact that the dominant left hemisphere is more quickly and more completely eliminated.

If we apply all this to mental processes, we may undertake to explain the various reactions to the selfsame hypoglycemic state by saying that here too those components of the mind which happen to be most dominant and active are most quickly and effectively eliminated. In accordance with this assumption we often see that a depression often changes during hypoglycemia to its opposite, so that the patient becomes manic; a manic patient becomes depressed, a confused patient becomes clear or lucid, an excited patient grows calm, or a stuporous patient becomes active again during hypoglycemia. I have therefore been led to assume that the hypoglycemic state first eliminates and inhibits that portion of consciousness in a psychotic subject which happens to be most active at the time, with the result that the other portions—which I may perhaps call the antagonistic part of the patient's mentality—again rise to the surface to again achieve dominance, even if only for a short time. In cases which progress favorably, repeated and correctly managed hypoglycemic states finally serve to produce a permanent dominance of those psychic components which hitherto have been repressed. In this way those portions which had been active before begin to retreat and fall into the background themselves. The remarkable observation of the so-called "activated psychosis" or "reversal of reaction" which I shall later describe, also fits into this picture. All these complicated attempted explanations, however incorrect they may prove to be, were necessary as a working hypothesis in order to develop the extremely complicated hypoglycemic method and technique. This method involves a modification in the time of termination of the hypoglycemic state in various psychotic states, for the most favorable results. This working hypothesis is only a schematic representation of apparently inconsistent clinical observations gath-

ered over a period of years, before they could be used to clarify the modifications of technique.

I will only briefly discuss the nature of this technique, since I feel that even the best description cannot serve to convey more than a vague picture to an audience. Even the most complete description without practical training and experience is not sufficient for a successful trial. Before hypoglycemia could be recommended as a therapeutic principle a technique had to be developed which allowed its systematic use with a minimum of danger. I must however emphasize that the mere technique of the hypoglycemic treatment of the psychoses is only comparable to a knowledge of ligature and asepsis in an operation. That is, it is an absolutely essential condition if dangers are to be avoided. But the success of an operation also depends on sufficient knowledge and experience on the part of the surgeon. In order to handle a hypoglycemic treatment successfully one has to be able to act quickly in accordance with each new situation while the avoidance of dangers ought to take place automatically almost without intruding on consciousness. The technical side of the hypoglycemic treatment in itself tells us nothing about the most important factors in the treatment, namely how each individual case has to be managed. However, the rules for the technique and method have to be strictly followed throughout the treatment, for they are the products of years of experience and careful observation. The fact that we do not yet know the factors which are operative in this treatment does not justify our arbitrarily erecting new principles. Too great an optimism in regard to this method is more dangerous than an overcautious pessimism, since it leads to an amateurish and unsuccessful use of the technique, with the failure finally falsely attributed to the therapy itself. The dangers of the treatment have to be avoided of course, but they ought not preoccupy the physician so much that he forgets the treatment itself, for in many cases favorable results can only be attained when the danger zone is reached.

The Technique

The technique requires that the patient be given increasing doses of insulin until the so-called shock dose is reached, the size of the shock dose varies considerably in different individuals and may be

anything from 15 to 450 units. The initial dose varies from 15 to 50 a day depending on the physical condition of the patient and the duration of his illness, and the doses are increased by 5 to 20 units daily until the shock dose is reached. This constitutes phase 1. By shock dose we understand that amount of insulin which in any individual produces deep coma with areflexia within 4 or 5 hours after one injection. (This is not always necessary.) A shock dose is given 3 to 6 times a week until the desired result is attained but if the patient does not respond no more than 50 injections need be given. This constitutes phase 2. After severe physical manifestations of shock, one or more rest days may intervene, but at least one to three days of rest are allowed every week. These constitute phase 3. Phase 4, which can often be omitted in chronic cases, consists of the administration of a fraction of the shock dose for about eight days, during which marked hypoglycemic reactions are avoided. The insulin injection is always given fasting and is followed in four or five hours by a sufficient amount of carbohydrates. It is often well to give the patient as many grams of sugar as he has had units of insulin. I should like to mention in passing that the blood sugar level, regardless of the amount of insulin given, does not drop beyond a certain level. The neurological symptoms of hypoglycemia or coma are not dependent on any one blood sugar level. I shall not undertake here to give an exact description or definition of the concept of coma or of the somewhat misleading term "shock," as these are things which can be learned in the course of practical experience. I shall only say, to prevent any misunderstanding, that coma should be associated with the absence of the corneal reflex, or at least with the presence of a Babinski. Individual variations have to be made continuously, as therapeutic results cannot be achieved by a stereotyped repetition of hypoglycemic states measured by so many hours, but depends instead on the correct management of each individual hypoglycemic state, and especially on its termination at the right moment. These are matters which can be learned only through long experience.

It would not be proper to neglect psychiatric factors in discussing the treatment of psychoses. Even in an essentially physical treatment of psychoses such as this is, a consideration of psychological and other psychiatric factors is especially necessary. For however

strong the impression may be that we are somehow influencing the psychic processes by means of biochemical processes, it must always be remembered that the opposite is possible as well. The activity of the brain and the very material it deals with in the course of normal physiological processes, are after all purely psychological. It is therefore not a matter of indifference to the mentally sick patient what his psychic problems and conflicts are, for this material must be elaborated under peculiarly difficult conditions, and the preoccupations and problems which he is forced to solve now under such difficult circumstances demand our special attention.

When for example we treat a patient with a peptic ulcer which is not due to a dietary error, it is nevertheless important to consider the patient's diet in the course of treatment, for this can facilitate, disturb or neutralize the cure which we achieve by other means. It is not otherwise in the treatment of psychoses. An incorrect psychological management of the patient's complexes in any psychosis, however organically or pathophysiologically determined, can cause great harm.

What has been said up to now is intended merely to chronologically summarize the development of the hypoglycemic treatment. The same holds true for the hypothetical considerations which served as a working basis for the further development of the treatment. However, mere theoretical considerations which may prove to be incorrect, or a statement of the difficulties of the technique are no proof that the treatment is useful or practicable. I am well aware that serious workers can be convinced only by definite clinical evidence of the value of the treatment. Since I shall not have time here to fully present the clinical evidence of results, I shall only attempt to review a few typical facts which demonstrate both the value and perhaps too the logical soundness of this therapeutic approach.

Even the small doses given at the beginning of treatment often produce marked changes in the psychotic subject. They become calmer and less tense. But these changes do not differ essentially, except perhaps in the quality of the sedative effect from the pacification achieved by other therapeutic measures. But these changes become dramatic and striking when more intense degrees of hypoglycemia are reached. These changes are so specific and dramatic that it is difficult to do justice to them in words. From one minute

to the next, the mental picture changes, so to speak, at a single stroke. One cannot escape the impression that the mental changes move consistently in a single direction. It almost looks as if the patient suddenly acquired, so to speak, a different style of thinking. Completely confused patients suddenly become lucid, even if only for a short time at first. Patients absorbed in their hallucinations suddenly lose them, excited patients grow calm, and in the same hypoglycemic state stuporous patients may be aroused. A paranoid patient for example will suddenly lose his delusions and ideas of reference when the hypoglycemia has reached a certain depth. In fact he gains insight into the abnormal nature of his previous hallucinations. In the early stages of treatment the patients become psychotic again as soon as the hypoglycemic state is ended. This change is so complete and abrupt that it almost seems as if one kind of consciousness had been replaced by another. As the treatment progresses these lucid periods last longer and longer, and the normal personality, so to speak, stays with the patient longer. When one sees over and over again how a patient of this sort achieves lucidity during hypoglycemia, and then becomes psychotic again after he has been given some sugar, how can one doubt that this change is intimately related to the hypoglycemia? The periods of lucidity during hypoglycemia become longer and longer and then begin to extend beyond the period of termination of the hypoglycemia. The periods after hypoglycemia during which the former personality dominates become longer and longer, and qualitatively better, until finally the periods last until the next following hypoglycemic state. One cannot escape the impression that each hypoglycemic period serves to remove another portion of the psychosis, so that the former normal personality can be more and more readily revived. When this has happened, a curious phenomenon develops. A patient that showed his normal personality for a short period during hypoglycemia when treatment began, now at the end of treatment, after he has improved, begins to show psychotic symptoms during hypoglycemia. I have called that the reversal of reaction. One practically witnesses the struggle for dominance between two kinds of consciousness. The consciousness which happens to be most active at a given time is paralyzed during hypoglycemia, so that the repressed consciousness again achieves dominance. The activated symptoms which appear in the course of this

reversal of reaction represent an abbreviated version of the patient's own past psychotic development. Those patients for example who do not respond to hypoglycemia with a complete and sudden even if temporary loss of their schizophrenic shell, may at least respond sufficiently to return for a while to some previous stage in their psychotic development. One can force the psychosis, so to speak, back step by step to its previous stages, and in favorable cases back again to the original prepsychotic personality. It would therefore be incorrect to conclude that the hypoglycemia has a specific anti-psychotic action; it is more correct, as the phenomena of the reversal of reaction and of activated symptoms show, to say that it is that part of the mind which happens to be most active and dominant at a given time which is subdued, to the advantage of the repressed portion. As treatment advances, however, the psychotic residue which is reactivated during hypoglycemia, diminishes and disappears in time. A clinical example:

N. N. A 21-year-old female university student of philology. Her family history seemed to show some taint, but the patient's family was hesitant about giving information. The patient herself was an excellent and unusually talented student up to two years before treatment started. In addition to her studies the patient was also socially active, was brilliant and likable and was always the center of her group. Gradually the patient began to neglect her studies, grew irritable and withdrawn, kept more and more to herself under the pretext that she did not get on with people, but gradually definite ideas of reference developed. It became clear in time that the patient was hallucinating. She finally had to be brought to a hospital where she remained for a year and a half. During this time her condition grew gradually but clearly worse. She was apathetic and unemotional, completely absorbed in the hallucinations and could scarcely be distracted from them for more than a few minutes at a time, to establish contact. She would always sink back into her autism, refused to answer concrete questions to the point, but referred instead to her hallucinations. She said Christ was communicating with her from the cross and was giving her commands, that He accompanied her on an aeroplane but had now multiplied Himself, because there was somebody at each window talking to her in a strange language. The patient herself knew several languages. The patient had no wish to work at all, kept muttering to herself, and conversed with her visions. She took no interest in the outside world, or in her relatives, was untidy and had to be fed. The outlook seemed very poor, and I did not at first expect a response to insulin treatment.

During Phase I the patient showed little response to small doses of insulin, both during and after hypoglycemia. It took a long time—about four weeks—before shock doses were reached at all. The type of shock reaction looked

prognostically poor too. The patient responded to shock doses with extreme excitement, and this appeared to be rather favorable evidence of an emotional response, even though of a pathological nature. Still more time was required until the hallucinations began to disappear for a short time at least during hypoglycemia. In the seventh week of treatment the patient responded to 170 units of insulin by losing her hallucinations about three hours after the injection. At this time she was able to establish contact, but was still emotionally flat and uninterested. She admitted that she no longer saw Christ nor heard his voice, but He had only gone away and would come back again. Half an hour later during hypoglycemia the patient suddenly became very emotional and excited for about half an hour. She then went into coma, which could not however be continued for long, because the patient would always develop sudden respiratory distress. The poor prognosis in the first place, and the unfavorable hypoglycemic reactions made me wonder whether it would be worthwhile to continue treatment at all. But since the mother of the patient insisted, treatment was continued. The patient's hypoglycemic reactions remained the same, but she slowly but surely began to show improvement. For several hours after the termination of hypoglycemia, the patient was sufficiently free of her hallucinations to begin to read papers again, which she had not done for two years. It was also possible to converse with her again. However, she showed hardly any insight into her illness, and was not interested to know why she was brought to a sanatorium in a foreign country. In the course of further treatment the patient developed epileptic seizures on three separate occasions, followed always with retrograde amnesia of short duration. After 12 weeks of treatment the patient began to be symptom-free both during hypoglycemia and thereafter. She no longer had hallucinations or delusions, began to act in a way appropriate to her training and surroundings, played tennis and visited the museums and cinema; she did not do these things spontaneously on her own initiative, but she was interested, and could converse sensibly. Except for a certain loss of spontaneity she was by now almost completely recovered. Since this already exceeded our expectations and since the patient was already under treatment more than three months, the treatment was concluded, to allow the patient to show the further improvement which we often see after treatment is concluded, with the possibility in mind that she could be given a second course of treatment if this did not occur. But after a few weeks she showed so much further improvement that she not only appeared normal to her family and friends but also to the physician after close examination. She no longer had the least trace of abnormality. Two years have since passed and the patient is still perfectly well.

The cases I have discussed were not chosen from the large clinical material because they were particularly favorable. I have had many cases that proved to be failures and in still other cases the treatment did not proceed without setbacks and difficulties. I chose

these cases not because they were successful but because they were good clinical examples of the relation between hypoglycemia and the changes in the mental or psychotic state. I hope that I have been at least somewhat successful in conveying to you the absolutely inescapable impression that one gets in following a case through treatment: that there is undoubtedly an intimate relation between improvement and the hypoglycemic treatment. Psychiatrists need no longer have that paralyzing feeling of insufficiency toward their psychotic patients that they used to have. They can now have instead a feeling that they now possess an instrument with which they can break through the barrier and attack the psychosis, so to speak, at its vital point. This fact alone would mean a great deal even if the statistical results were not as good as they are. When I think again of my own clinical material, which comprises about 300 cases which I have treated myself, to say nothing of at least as many cases which I have seen treated elsewhere, and consider how often I have seen improvement follow the treatment, improvement in many cases amounting to recovery, to an extent which has up to now been unprecedented in schizophrenics, and when I consider the numerous transitory reactions in which schizophrenics suddenly became accessible again, or when I consider the other various changes in the psychotic picture which occur during treatment, the conclusion becomes inescapable that these changes and these improvements were actually caused by the treatment. Regular and repeated changes of this sort cannot be due to mere coincidence. I shall only briefly summarize the results:

In spite of the difficulties there are in preparing statistics in the case of a disease like schizophrenia where there are no objective symptoms with which we can establish the diagnosis or evaluate the results, nevertheless I think that with material as large as mine, it is possible to avoid the errors involved in a smaller group of cases.

I have divided the case material into three groups: recent cases of less than six months' duration, cases of less than one and one-half years' duration and chronic cases of over one and one-half years' duration.

In the successfully treated cases the concept of a full remission is very strictly defined. We have only included those patients in this group who were not only symptom-free, with full insight into their illness, and with full capacity for return to their former work,

but also where one had no intuitive feeling that there might have been some change in personality.

We called those patients good remissions who were completely symptom-free and who had insight and were able to go back to their work, but where one had the intuitive feeling that there was some personality change.

Under social remissions we understand the third group of patients with more or less marked improvement, but who are not however included in the group of successfully treated cases.

In recent cases the treatment has given us over 80 per cent of good remissions with capacity for work of which about 70 per cent are full remissions.

In chronic cases the results are all poorer in direct relation to the duration of the illness. In our group of cases we have had 40 per cent of remissions with capacity for work. The statistics for spontaneous remissions vary with different authors from approximately 5 to 25 per cent. When we consider that the results in our treated cases are several times better than the most optimistic statistics for spontaneous remissions, and when we consider further that the quality of remission in our treated cases is far superior than that of spontaneous remissions, then we are entitled to conclude that the treatment is effective. The impressive reintegration of personality that we saw in the course of treatment of recent cases, led us at first to treat only recent cases and we at first neglected the chronic cases where the chances of recovery seemed so much poorer. But after more intensive experience with chronic schizophrenics in hospitals, my therapeutic experiences led me to change my views.

In the course of the introduction of the treatment to this country I had the opportunity, through the invitation of State Commissioner Dr. F. W. Parsons to conduct a course for the State Hospital System of New York. The case material which was available at the time of the demonstration of the technique to the physicians was not particularly favorable. However, in spite of the unfavorable material it was possible to allow about half of the twenty patients to return to their homes again, in some cases with capacity for work, and a few others with good remissions, while the rest of the patients were at least sufficiently improved to allow them to lead a tolerably human existence in the institution, so that even these re-

sults can now be said to be by no means a matter of indifference, and from a humane medical point of view, definitely positive.

Dr. Ross, Superintendent of Harlem Valley State Hospital, will give you an account of the results of my attempt to sponsor the treatment on a large scale, under the most favorable possible conditions in this country. He will tell you more of the actual cases which were treated either directly by me or under my supervision by the physicians I have instructed.

PRESIDENT CAMPBELL.—At Dr. Sakel's suggestion, we shall ask Dr. John R. Ross, superintendent of the Harlem Valley State Hospital, Wingdale, New York, where Dr. Sakel has been carrying on so much of his work, to follow Dr. Sakel's paper.

REPORT OF THE HYPOGLYCEMIC TREATMENT IN NEW YORK STATE HOSPITALS.

By DR. JOHN R. ROSS, Wingdale, N. Y.

My remarks this morning are more in the nature of a supplement to Dr. Sakel's paper rather than a discussion of hypoglycemia as a whole.

It is not my purpose to theorize or offer scientific explanations concerning the effect of insulin on our patients. What I think interests this group, particularly those physicians who are stationed in State institutions, is what effect hypoglycemia is likely to have on the large group of continued treatment patients that fill the hospitals. Does this therapy offer any hope for long-standing cases? Unless this type of patient can be helped, from our standpoint at least, insulin will have little value because it is quite evident that we do not receive nor are we likely to receive for some time, at least, those patients who are in the very early stages of their disease. If a psychosis which has lasted more than six months or a year will not respond to hypoglycemia, little can be hoped for in the state institutions. With the idea of clarifying this point, Dr. Parsons, the Commissioner of Mental Hygiene in the State of New York, decided the best way to find out was to institute treatment in all of our institutions and check results. Because there is danger to life in this treatment if unskillfully managed, it was felt that it should not be done by untrained individuals. Dr. Sakel was invited to instruct a group of physicians from the different institutions in New York State in his technique, and he very generously contributed six weeks of his time at the Harlem Valley State Hospital giving such instruction. Treatment was begun on December 8, 1936, and Dr. Sakel visited daily.

The patients selected for treatment in this initial group did not offer a good prognosis in a single instance. Before treating, it was necessary to obtain permission from relatives and this was the criterion used in selecting patients. Although the material was poor it gave an opportunity for the physicians to acquire the technique and see dangerous symptoms handled by the discoverer of

the treatment in person. The results obtained from this first group of patients were surprising. With the exception of two all showed a definite improvement and a number were sent home apparently recovered. After this course was finished the physicians returned to their various institutions and started the treatment in their respective hospitals.

I am today reporting the results obtained so far in New York State with this form of therapy: Five hospitals have no statistics available yet, so that the total number of hospitals who have cases where treatment has been finished is 14.

I am reporting the findings at the Harlem Valley State Hospital separately, because treatment has been going on there for a longer period of time than at the rest of the institutions in the state, and it has been supervised by Dr. Sakel from its inception. Of late, weekly visits have kept him in touch with the treatment. The report for the whole state will not include the figures of the Harlem Valley State Hospital, but can be used as a check. This report is "as of April 24, 1937."

At Harlem Valley.

The total number of patients treated and now under treatment is 77. Treatment has been completed in 38 patients. The prognosis in the greater number of these patients was poor; possibly one or two might be called guarded. As to diagnosis, there was a difference of opinion in one or two of the patients treated, but my own opinion is that all were in the dementia præcox group. If there was any question at all as to diagnosis, it can at least be said that the patients were not improving and gave evidence of being individuals who would remain in the hospital indefinitely. Of the 38 completed cases, 19 have been paroled home and of this number, 12 apparently have recovered; 4 were much improved and 3 were improved. Of the patients still remaining in the hospital of these 38, 9 were improved and 10 were unimproved. Percentages are as follows:

	Per Cent.
Apparently recovered	31 +
Much improved	10 +
Improved	31 +
Unimproved	26 +

Among the patients treated was one of a pair of identical twins. One twin was not treated. These individuals came to the hospital about the same time, their psychoses were almost identical as to duration and symptomatology. The treated twin was sent home and on his own initiative obtained a position which pays him $19 a week, and from reports which he makes regularly, he is apparently getting along well. A letter received since making this report states his salary has been raised. The untreated twin was sent home at a later date slightly improved. He was unable to adjust and has been returned to the institution practically in the same condition as when first admitted. He is to receive the insulin treatment and it will be interesting to see the results.

In the entire state the number of patients who have been treated and are now under treatment is 286, exclusive of Harlem Valley State Hospital. At the next meeting of this society, we hope to be able to have statistics that will be of value. The total number of finished cases is 89. Of that number, 39 have been sent home; 23 apparently recovered; 9 much improved; 7 improved. Of the finished patients who still remain in the hospital, 7 are apparently recovered; 10 much improved; 11 improved and 22 unimproved. The prognosis reported from all over the state in the great majority of cases was poor. A few were reported as fair and a still smaller number, actually one or two were reported as good. The latter cases were reported from the Psychiatric Institute in New York City.

The patients paroled home we have called "apparently recovered" because the time under observation away from the institution is altogether too short to make a more definite statement.

From the state the figures in percentages are as follows:

	Per Cent.
Apparently recovered	32 +
Much improved	21 +
Improved	20 +
Unimproved	24 +

If this can be continued, it is quite evident that we have obtained a potent agent to deal with dementia præcox. These figures make us feel that the treatment should be carried on and we hope that other institutions throughout the country that are not now treating will institute such treatment and check against our results.

The State of New York has been fortunate in having the advice and supervision of Dr. Sakel and to him we extend our thanks for instruction and advice. Dr. Parsons, our Commissioner, is pleased to extend the hospitality of our hospitals to other hospitals that wish to send physicians for instruction in the technique. At the next meeting of our organization we should have sufficient information to state definitely as to the value of hypoglycemia.

EXPERIENCE WITH THE HYPOGLYCEMIC TREATMENT OF SCHIZOPHRENIA.*

By SOLOMON KATZENELBOGEN, M.D., HERBERT HARMS, M.D., and DEAN A. CLARK, M.D.,
Baltimore, Md.

Since July, 1936, we have treated 22 patients. We followed Sakel's original procedure as to its essentials, and the special recommendations he laid down in his latest publications. Up to the time of writing this report (end of April, 1937), the treatment had been concluded in 16 patients. Our experience with the treatment in these as well as in the six patients in whom the treatment is not yet terminated, will be discussed under the following headings:

1. Dosage of and tolerance to insulin.
2. Physiological and personality reactions following the injections of insulin.
3. Difficulties and dangers attached to the treatment.
4. Therapeutic effects.

Dosage of and Tolerance to Insulin. Blood Sugar Changes.

The amounts of insulin sufficient to provoke the so-called shock, or hypoglycemic reactions, varied within wide limits in our patients—from 25 to 200 units. In a patient, 60 years old and hospitalized for 14 years, 25 units consistently provoked profuse perspiration, excessive salivation and deep coma. Similar reactions were caused by 35 units in a patient 46 years old and ill for 13 years. After a five-week period of treatment the dose of insulin had to be raised to 45 units in order to provoke coma. On the other hand, in a patient 16 years old and ill for 17 months, there were either mild or no reactions until the gradually increased

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amounts of insulin reached 200 units. This dose regularly provoked deep coma. This patient remained dry most of the time during the treatments and only occasionally perspired mildly.

In another patient 17 years old and ill for 18 months, the shock dose which for a certain period of time consistently provoked profuse perspiration and coma was 195 units. Subsequently, gradually decreasing amounts of insulin, down to 100 units, had the same effect. Moreover, during this phase of treatment, the patient reacted with more or less generalized convulsions to 140-100 units. Obviously, the patient's tolerance to insulin was lowered in the course of the treatment.

The dose of insulin to be used also depends upon the kind of reactions which one wants to obtain. In a patient 27 years old and ill for seven months, because of his mutism and inactivity, our aim was to interrupt the treatment at the first sign of activity in speech and action. This was achieved during several treatments with 35 to 80 units. Then, in view of the fact that the patient became extremely restless, combative and confused during the treatments and again mute in between the treatments, we thought it worth trying to provoke coma. In this we succeeded when the gradually increased amounts of insulin reached 150 units.

The lowest blood sugar value obtained four hours after the injection of only 25 units of insulin was 18 mgm. per cent. Values between 20 and 36 mgm. per cent were frequently found. Examination of blood sugar every one-half hour during four hours after the administration of insulin showed that the lowest glycemia was reached from one to two hours after the injection. The low level remained practically unchanged during the subsequent three to four hours. In some of our patients there was a marked disproportion between the dose of insulin and the depth of the hypoglycemia. In all of our patients there was no consistent relationship between the amounts of insulin and the blood sugar values obtained within four hours after the injection.

Physiological and Personality Reactions Following the Injections of Insulin.

The reactions which one commonly observes during the individual treatments are the following: wide fluctuations in the pulse rate; decrease of 20 to 30 and increase of 40 to 60 beats per minute

are not unusual. The lowest pulse rate we observed was 47. Bradycardia usually occurs first after the insulin injection. It is followed by a normal pulse rate or tachycardia if the patient becomes restless. During the coma, the pulse rate is again first decreased and then it goes back to normal or above normal. At times the pulse becomes weak and irregular, but most of the time it is of good quality. The blood pressure changes usually are not beyond physiological variations. The respiration rate fluctuates within narrow limits; the maximum change in one of our patients was from 18 to 28. The deviations below the average normal limits are not significant. Irregular or stertorous respiration or heavy deep breathing during the comatose state are quite frequent. The temperature more often than not decreases significantly and in some patients considerably. In one of our patients the temperature went down from around 99 to 94.8°—94° during several treatments before the patient went into coma. In another patient the temperature dropped during one treatment from 98.3° to 93.2° and in another treatment from 97.4° to 91.6°. A marked elevation of the temperature (axillary temperature from 97° to 102.6°) was noted five hours after the administration of glucose in a patient who was extremely restless and had generalized convulsions during the treatment. The physical examination was negative. The next morning the temperature was 98.4°. The pupils remain most of the time normal or dilated; marked contraction occurs only occasionally. Abolition of corneal reflexes, weakness of the plantar reflexes, or a mild extension of the big toe, muscular relaxation and not infrequently very transitory rigidity were noted in many of our patients during coma. In one patient, 28 years old and ill for seven years, the termination of a treatment by intravenous glucose was followed by the patient's inability to grasp or hold objects with the right hand. One hour later he could use his arm slightly; this condition cleared up within three hours. Tremor around the mouth or of the hands occurs occasionally during the comatose state. Shivering with complaints of feeling cold (chill) is of more frequent occurrence. In one patient, while he was excited, there was tremor of the hands and twitching of the left eye. Intermittent pallor and flushing of the face are of very frequent occurrence. Cyanosis of the face is to be seen at times only in certain patients.

The most common reactions are profuse perspiration and marked salivation, but there are patients who remain consistently dry or perspire very mildly; yet they salivate abundantly and otherwise they react to insulin intensively. More or less marked drowsiness—the patient remaining, however, responsive—is a very frequent reaction irrespective of whether or not he eventually goes into coma.

The most dramatic and also most common reactions are excitement, motor restlessness, confusion, localized and more or less generalized clonic convulsions and deep coma. It was noted in one of our patients that twitchings and convulsions consistently began on the right side of the face, then spread in the right upper and lower extremity; they remained there localized or culminated in generalized convulsions. In other patients, the twitchings were from the start quite marked in both legs, or in the face and upper limbs. The sequence of the symptoms is not always the same either in various patients or in the same patient on different days although receiving the same amount of insulin. Perspiration and slowing of pulse usually become more or less pronounced within the first or second hour after the injections. This is the phase of complete or relative quiet, but it is not infrequently marked by twitchings; the quietness is often followed by restlessness which varies in intensity and duration. Coma is commonly the ultimate reaction. Yet it is during the comatose state that localized or generalized convulsions may take place. Out of our 16 patients in whom the treatment was concluded and the six patients who have been under treatment from three weeks to over two months, only four had convulsions during some of their treatments. Each patient usually reacts along the same pattern throughout the treatments when the dosage of insulin remains within certain limits. Yet the quality, intensity, sequence and duration of the physiological reactions, all other conditions being equal, may vary in the same patient on different days.

The personality reactions, aside from frequent complaints of weakness, do not lend themselves for a general description. Only a few examples will be recorded here for illustration:

A patient, 60 years old, hospitalized for 14 years, mute, uninterested in the environment, uncooperative, talked for a few minutes at the end of certain treatments, when aroused from coma by intravenous glucose. Once he said, "They beat me if I talk," and on another occasion he said that he remained silent because someone would kill him if he talked.

A man, 25 years old, ill around a year and mute about six months, while he was restless said, "Why don't you let me go home, why do you keep me in bed all the time? I am not sick," and then continued rambling from one subject to another. A 16-year-old boy, ill for 17 months, in a state of confusion, bewilderment and motor restlessness, once when aroused from coma said, "Couldn't you cancel the order for tomorrow?" (What order?) "The order to stick me. . . . . Gee, golly! If they stick me again, I won't be here." (Where will you be?) "Well, there won't be any R. B. (his name), that's all." A man 27 years old, ill around seven months, was mute for two months before the beginning of the treatment. After most of the injections he appeared puzzled, confused, frightened, sobbed, "Jesus Christ. . . . ." "God damn damnation, where am I?" He readily took 250 grams of glucose. After that he complained of feeling "Down, down, down." He became very excited, roared, "I am getting God damned sick of these days. I am going nuts—where is my father, where is my mother, where is my sister? God damn, where is everybody"? He gradually quieted down, but continued to ask for his family. He wondered about the treatment and kept on saying, "I don't understand it."

There was no consistent relationship between quality and intensity of physiological and personality reactions, depth of hypoglycemia, and dosage of insulin in different patients, or in the same patient in different individual treatments.

Difficulties and Dangers Attached to the Treatment.

The much dreaded hypoglycemic complication in insulin treatment in general rose to a therapeutic virtue, but it did not rid itself of its hazards. Fortunately, experience shows that in case of menacing symptoms, quick administration of glucose alone or coupled with adrenalin brings the patient rapidly out of danger. One of our patients reacted with coma to five successive treatments with 195 units. During the sixth treatment with 195 units the patient, in his usual coma, suddenly had a collapse of the cardio-vascular and respiratory functions, which rapidly yielded to intravenous glucose and adrenalin. Coma, regarded as the most important therapeutic phase, is allowed to stay from one to two hours, but it commands close observation of the patient. Convulsions, localized and more or less generalized, occurred in four patients during several treatments. Regarding them as dangerous, in contrast to other investigators, we immediately counteracted the effect of insulin with intravenous glucose and adrenalin.

Because of the usually pronounced salivation, aspiration of saliva presents a danger during the comatose state. We were particularly concerned about this possible complication in a patient who on two occasions vomited after the nasal gavage of glucose while he was still drowsy; we therefore substituted the gavage by intravenous administration of glucose during several treatments. Then we returned to the nasal gavage but administered only 300 instead of 600 cc. of a 25 per cent glucose solution. In addition, the glucose gavage was preceded by giving atropine (16 drops of a 1:1000 solution) through the nasal tube. With this procedure, vomiting occurred much less frequently.

Another danger lies in the possibility of aggravation of shock reactions soon after the administration of glucose and of recurrence of shock reactions when they are least expected, namely, a few hours after the termination of the treatment. The recurrence of hypoglycemic reactions took place in three of our patients from four to five hours after the conclusion of the treatments. We learned *post factum* that two of them did not receive the full amount of glucose and ate little. The third patient, in his fourteenth shock treatment with the same dose of insulin, took his usual amount of glucose and ate a substantial lunch. Yet four hours and thirty minutes after the termination of the treatment he developed another hypoglycemic reaction. The blood sugar was 32 mgm. per cent. The reaction rapidly yielded to the administration of glucose.

From our observations we also learned that schizophrenic patients, like normal individuals and diabetics, may have an average normal tolerance to insulin, or a high or a low tolerance. The four patients in whom the minimum "shock" doses were respectively 25 units, from 35 to 80, 195 and 200 units illustrate this point. (See, Dosage and Tolerance to Insulin.) In proceeding cautiously, that is, starting with 10-15 units and increasing the daily dose gradually by 5 units we made the very significant observation that the adding of only 5 units to such high amounts as 190 and 195 units made a great difference in that it provoked the desired but hitherto not obtained comatose state. The tolerance to insulin could not be related to duration of illness.

Finally, some of our patients offered examples illustrating the well known fact derived from studies on experimental diabetes in animals and diabetes in man, *i. e.*, hypo- and hyper-sensitivity to

insulin may remain consistent or may be intermittent throughout the treatments. The intermittent hypersensitivity, acquired in the course of the treatment, accounts for the fact that an amount of insulin which on many occasions had not caused significant reactions, suddenly and for no apparent reason, provoked very serious reactions.

The Therapeutic Effects.

THE MAIN FACTS BEFORE AND AFTER THE TREATMENT.

Out of the 16 patients in whom the treatment was concluded, only the first patient's record will be described somewhat in detail. In the remaining records only the main facts noted before and after the treatment will be outlined.

Case 1.—A girl, 15 years old, from the beginning of school in the fall of 1935, complained of tiring easily. In December, 1935, she gave up school on the grounds of strain. Between December, 1935, and July, 1936, she worked as a housemaid. During six months she held seven positions; she gave up the various positions, usually after 2-3 weeks, because of "overwork."

About ten days before admission to the Phipps Clinic (on July 4, 1936) she became overtalkative, excited, and left her job. At home, she appeared frightened and complained of pains in her head and eyes. She talked of being exhausted, of fear that she would lose her mind. She claimed that people were against her. On one occasion she said the food was doped. She misidentified people and also said she was someone else. She was preoccupied and appeared to be listening to voices and made up new words. Her sleep and appetite were good.

On admission to Phipps, the patient was grimacing, laughed and cried intermittently without provocation and talked inaudibly to herself. When asked about her spirits, she said: "I feel fine, I feel better . . . . I can't speak. I know the Ku Klux Klan by heart. It is so hard, they want to ask me truths—untruthful and everything." She claimed that Masons hated her, that everyone was jealous of her and teased her. When asked whether food at home was all right she said, "I can't tell the difference, sir . . . . they ask me what is p, q, r, ja, the American Zoo. I went through the test of American vaccine. I was taught the Abc's backwards. I never told a lie in my life." She said she saw visions and smelled awful odors. Orientation was good.

The patient is of asthentic habitus. The physical examination is not contributory.

The patient has always talked in her sleep. In high school she had failing grades in English, geometry, biology, and as a housemaid she was inefficient. Her I. Q. 107.

Her personality is described as quiet, sensitive, opinionated, quite a good mixer, not interested in religion or sports.

Mother and father separated when the patient was six years old. The mother was found to be paranoid in 1920 in the Phipps Dispensary.

Preoccupation and lack of attention were very marked most of the time and she had to be spoon-fed. Her behavior suggested that she saw and heard things. Her voices she said were "echoes" which were her own and made her lips move. She believed herself to be a Crown Princess who had lost her birthright by fraud practiced by the church. During her nearly two months stay in Phipps Clinic, she gained weight, but otherwise her condition remained unchanged.

On September 1, 1936, the patient was committed to Spring Grove State Hospital. Upon admission she showed very marked preoccupation, numerous mannerisms, appearing to react to delusions and hallucinations. On October 1, she said she was an Indian princess and expected to become a queen. She also talked in a rambling manner of being related to Captain Blood.

At the time of beginning of the insulin therapy (November 11, 1936), the patient was aimless in her activity, preoccupied, uninterested, apathetic, and would respond to no suggestive stimulus in an effort to re-interest her in work or play. She at times expressed ideas that she was Queen of France; she was careless in dress and about exposing herself; her eating habits were poor; she had to be urged to rise in the morning and throughout the day it was necessary to supervise her routine.

When questioned, she would not answer for long periods of time, would often forget the question asked in her preoccupied state, and would never re-state her experiences in the other hospital or tell her physician's name.

Outstanding Features.—Complaint of tiredness and inefficiency for eight months before the onset of the psychotic reactions. This caused the patient to quit school and to change seven positions as housemaid within six months. Preoccupation. Ideas of persecution. Grimacing, unprovoked laughing and crying. Irrelevant and incoherent talk. Neologisms. Listening to voices, seeing visions, smelling awful odors. Believed herself to be a Crown Princess, an Indian Princess, expecting to become a queen, the Queen of France. Careless in dress. Exposing herself. Poor eating manners. Age 16. Duration of psychosis around five months.

Insulin Treatment.—The treatment was carried out from November 11 to December 19, that is, five weeks. The first dose was 10 units. The amount of insulin was increased by 5-10 units at each of the subsequent injections; the maximum shock dose was 85 units.

From November 11 to November 19, the patient received eight injections, the doses of insulin being between 10 and 50 units. No significant reactions were noted during these eight treatments. From the very beginning and throughout this period of treatment, during which there were no shock reactions, the patient's behavior improved strikingly: appetite was good; she was cooperative, quiet, working about the ward.

From November 19 to December 19, the patient received 13 injections, the doses being from 50 to 85 units. During this period of treatment, she reacted more or less to each injection. The following reactions were noted: Perspiration, complaint of weakness, drowsiness, moaning, difficulty in breathing (noted only once), dilated pupils, marked salivation, coma.

Out of these 13 treatments, in seven the patient was aroused from her comatose state by intravenous glucose in 50 per cent solution. The other six treatments were terminated with glucose given by mouth and followed by the regular lunch meal. During this period of shock treatments, the nurses notes on the patient's behavior after each treatment—the rest of the day—read as follows: Very cheerful, pleasant and cooperative, reading or sewing, helping on the ward.

The fasting blood sugar, before the injections of insulin was around 80 mgm. per cent. On two occasions, about four hours after the injections of 70 and 85 units, the glycemias were respectively 86 and 55 mgm. per cent. On the other hand, four hours after the injection of 45 and 50 units the glycemias were 40 and 39 mgm. per cent.

The progress the patient achieved during the treatment may be briefly stated as follows: already in the period when she did not react at all or reacted mildly to insulin, she brightened up, became cheerful, cooperative, spoke more readily, although still briefly. After three shock treatments, she took much interest in her personal appearance. She began talking spontaneously to the nurses, began reading for long periods and would show knowledge of the general story if quizzed. She began to enjoy visits from her relatives and talked for long periods with her mother, who was delighted with the change. The patient began to look forward to leaving the hospital and to this end she made definite plans. She was somewhat indefinite about what she would do upon leaving; whether to return to school, to remain at home, or to attempt some work. When it was formulated to her that she should make every effort to occupy herself upon leaving the hospital and that it might be a good idea to finish her last year of high school, she fell in with the plan, although in a rather submissive way.

With regard to her previous delusional and hallucinatory experiences, she at first attempted to side-step the issue and then said that she did not have such ideas any longer and that perhaps they were only imaginations. With these statements she smiled and was very happy not to be pressed in this respect.

When questioned about the insulin treatment, she described briefly the increasing fatigue, the onset of hunger symptoms, and the gradual loss of awareness, followed by her unconscious state. In her waking state, she had no conception of the length of time of the coma; there were no dream experiences elicited, and in the patient's own words, she felt as though she had been "merely asleep but nothing more."

The patient was paroled from the hospital in care of her mother December 24, 1936, with the understanding that she will report at bi-monthly intervals for follow-up.

At the time of writing these notes (end of April, 1937), four months after the conclusion of the insulin treatment, the patient has again taken up with her friends, is doing housework in her own home and has made spontaneous efforts to find clerical work. It is felt by the family that she is as well as she was before her illness. Since leaving the hospital she has returned at two-week intervals for interviews. The remission has continued unchanged. The patient herself feels that she has undergone a mental illness for which she has no explanation but that she is well now.

Points of interest:

1. Beneficial therapeutic results were obtained in a patient who showed definite parergasic reactions during five months prior to the treatment.

2. The treatment was of relatively short duration—five weeks.

3. Gradual improvement was noted soon after the beginning of the treatment, although the patient showed little or no reaction to the individual insulin injections.

4. Greater improvement was observed after the treatments which provoked marked so-called shock reactions.

5. There was no consistent relationship between intensity of reactions to insulin and degree of hypoglycemia.

6. There was no consistent relationship between dose of insulin and degree of hypoglycemia.

CASE 2.—H. A. The patient, 25 years old, at the beginning of the treatment had delusions of being doped, auditory hallucinations and peculiar somatic sensations. The duration of his illness was seven months. He received 16 injections, six of which were followed by very severe reactions.[1] He gradually improved in the course of the treatment which was of only one month duration. After the conclusion of the treatment he worked well on the ward and showed no abnormal behavior. The formal mental status examination definitely and very favorably contrasted with the findings before the treatment.

Throughout the treatments, the patient had very pronounced reactions, particularly motor restlessness, and moderately low blood sugar levels—approximately 50 mgm. per cent—following the insulin injections.

The remission lasted nearly three months. Then the patient began to complain of diseases for which he coined names, "brainitis," "blooditis," etc., talked about having "all kinds of phobias" and became uncooperative, profane and vulgar. He remains in the hospital and has shown gradual improvement without further use of insulin.

[1] In this, and in the following abstracts, "severe reactions" are those culminating in the semi-comatose or comatose state.

CASE 3.—Z. R. The patient, 28 years old, before the treatment had ideas of being persecuted by communists, hearing voices giving him conflicting directions and calling him bad names, ... "voices want to keep me here to trap you people," and ideas that his wife was unfaithful. The duration of his illness was six months. He was on insulin treatment from September 9 to November 20, 1936, receiving 31 injections, 24 of which were followed by severe reactions. As the treatment advanced, he gradually became cooperative, industrious on the ward and cheerful. He had more insight into his condition, dropped the ideas about his wife running around with other men, had no delusions and heard no voices. He was discharged on parole January 12, 1937, and shortly afterwards went back to work in the bakery where he formerly worked. Unfortunately, his family arranged for him to live alone in a room and not with them. After about a month of regular work, he became preoccupied, suspicious, developed ideas of being influenced by others, of being doped and felt there was a political plot against him. He returned to the hospital in a much more cooperative mood than at his first entry. A second course of insulin is contemplated, but has not yet been carried out.

The points of interest in this case are: Distinct therapeutic benefit was obtained but it lasted only six weeks. During one treatment he had convulsive movements associated with a blood sugar of 22 mgm. per cent. There was no consistent relationship between severity of reactions, depth of hypoglycemia and dose of insulin.

CASE 4.—J. F. A boy, 16 years old, since April 7, 1936, has been seeing men dressed in black who were going to "get" him. He crawled under his bed to pull them out and called to members of his family for help. In the hospital at the beginning of the treatment the main features were mutism, grimacing, uncooperativeness, resistance, negativism, soiling. Duration of his illness was four months.

The patient received the insulin treatment from July 21 to November 10. He had 48 injections, 23 of which were followed by severe reactions. With the progress of the treatment, he markedly improved in that he no longer soiled, carried on brief conversations, and showed more spontaneous activity. When talked to he was pleasant, cheerful, answered some questions, or smiled and nodded his head. One is justified in speaking of a distinct but moderate therapeutic effect. At the time of writing these notes (end of April, 1937), the patient is much easier to handle on the ward, is doing a full day's work in the hospital kitchen, has been home on short visits. We expect him to leave the hospital on parole shortly.

CASE 5.—E. F. A 25-year-old male was ill around a year. The outstanding features were: Delusions of being persecuted by dope peddlers and of food poisoning; ideas of reference; hearing the voice of God; restlessness, deliroid condition; mutism most of the time for about six months. He received 28 injections, 22 of which were followed by severe reactions. While the patient's responses to insulin were very pronounced, prespiration was either

absent or mild. Some favorable change in behavior was noted after each treatment, but it was frequently limited only to a few hours. The patient also showed slight sustained improvement for three months, being much easier to handle and doing some work on the ward; he has been on visits home. Now. (end of April, 1937), he is undergoing a second course of insulin treatments.

CASE 6.—J. L. The patient, 60 years old, was hospitalized for 14 years. The main facts for the last eight years: Mutism; lack of interest in the environment; uncooperativeness; marked cataleptic reactions. The patient was highly hypersensitive to insulin. Twenty-five units consistently provoked strong reactions, including deep coma and very low glycemias, between 18 and 22 mgm. per cent. He received 32 injections with 25 severe reactions. After several treatments, when aroused from coma by intravenous glucose, he talked for a few minutes (see physiological and personality reactions). There was no permanent therapeutic benefit from the treatment.

CASE 7.—T. G. In this case the following features were outstanding: A long record of disorderly conduct, burglary and imprisonment. Delusions of sexual content. Auditory and visual hallucinations. Passivity feelings. Ideas of reference. Age 32 years. Duration of illness six years.

Before treatment the patient was quiet, seclusive, looking suspicious, and frequently combative for no apparent reason. He was a good worker on the ward, but needed constant coaching. He conversed coherently and relevantly about his past but persisted in his claims that people call him vile names at night and that he hears people or voices making him homosexual advances. He was given 31 injections; 18 were followed by severe reactions. A remarkable change in his behavior was noted already after the first shock treatments. He gradually became more sociable, looked livelier, contented, was spontaneously very active on the ward and obviously enjoyed his work. He ceased his outbursts of temper and no longer expressed delusions or hallucinations. The treatment was concluded on November 20, 1936. In January, 1937, he went home with his family, expecting to go to work immediately. At the time of writing these notes (end of April, 1937) the patient is at home and well. For the last six weeks he has been working in a local cannery twelve hours a day with success.

CASE 8.—F. G. T. Male patient, age 27 years.

Outstanding Features—Ideas that his sexual experiences had something to do with the pregnancy of his sister. Auditory and olfactory hallucinations. Feelings of persecution. Suspicious of food. Self-accusation. Sadness. Preoccupation. Fright. Feeling of being "half a man and half a woman." Unreality feelings. Mutism. Motionless. Crying spells and loud laughter. Passivity feelings. Ideas of reference. Duration of illness around seven months.

The patient was given 57 treatments. He had severe reactions during 39 treatments. In 20 of the latter there was very deep coma, in 11 there were

marked twitchings around the mouth, face, neck, and arms, and in 8 clonic generalized convulsions. Twitchings around the mouth turned into generalized clonic convulsions which on two occasions lasted from one to one and a half hours, but with many 5 to 10 minute intervals free from convulsions. After two treatments which caused convulsions, the temperature at 5 p. m. was respectively 101° and 102.6°. The patient reacted violently to 70-80 units with fright, perplexity, bewilderment, confusion, suicidal talk and fighting to get out of the situation. There was favorable change in the patient's behavior following these violent reactions, but only for one or two hours. There was no favorable change after treatments without severe reactions. With 150 units the reactions were rather mild and culminated in coma. The patient's weight increased from 145 to 157 pounds during the treatment. There was no benefit from the treatment.

CASE 9.—R. E. B. Male, age 18 years.

Outstanding Features—Preoccupation with ideas about his body defects: "My ears are too big and stick out from my head." His "eyes changed color." The Lord kept telling him what to do and say. He heard during the night God's voice telling him to kill himself and he cut himself with a knife on the left wrist. Loss of interest in his usual pleasures. Attitude of hopelessness, resignation and indifference toward his illness. Seclusiveness. Period of agitation; impulsiveness; panicky; confused and bewildered state. Stuporous state, catalepsy, mutism. Posturing with ideas of "flying to heaven." Duration of psychosis about eight months.

The patient had 103 treatments, 50 of which were followed by deep coma. The so-called shock or hypoglycemic reactions (drowsy state before going into coma; occasionally slight twitchings around the mouth; slight perspiration) occurred in this patient only when the gradually increased amounts of insulin reached 200 units. After the termination of each treatment, he more often than not was in good rapport, answered questions correctly, was relevant and coherent in speech and action, although not very spontaneous. This lasted from one to two hours. After some treatments the patient's behavior remained markedly improved during the entire afternoon. His weight increased from 125 to 135 pounds. No durable benefit, however, was derived from the treatment.

CASE 10.—P. M. Male, age 17 years.

Outstanding Features—Seclusiveness. Covering his face with a handkerchief because voices told him to do so in order to prevent germs from coming out and infecting the public. Preoccupation. Open masturbation. Talk of building a trans-Atlantic bridge. Suspicious that people are plotting against him. Mannerisms: Posturing, walking like a soldier with Napoleonic pose and goose-step. Gesturing. No insight: "I am not really sick at all. I have no particular trouble." Duration of illness one year and five months. This patient received the treatment for over three and a half months, with a total of 90 injections, 34 of which were followed by severe reactions with deep coma; on several occasions there were also generalized clonic convul-

sions. The patient first had a high tolerance to insulin: 195 units were needed to cause coma. In the course of the treatment his tolerance was lowered; he reacted with coma to 100 units. There was no change in the patient's behavior during the individual treatments. No benefit was derived from the treatment.

CASE 11.—M. L. G. Female, age 24 years.

Outstanding Features—Unresponsive to environment. Careless of personal appearance. Screaming without apparent emotion. Incoherent and irrelevant talk. Her "mind is divided into four parts." Duration of illness around two years. This patient was hospitalized first for six months, then on parole for a year, and again hospitalized for five months before the beginning of the treatment. She received 67 injections with 55 severe reactions. After several treatments there was some improvement in her behavior, which lasted only a few hours. Now (end of April, 1937), she is considerably more interested in her surroundings, is much easier to care for, takes pains with her personal appearance but is not well enough to leave the hospital.

CASE 12.—M. C. Female, age 36 years.

Outstanding Features—The patient was ill for eleven years with numerous remissions, during which she had been discharged on parole. She has been better usually in summer than in winter. Before the insulin treatment the patient was mute and when spoken to would shield her face with her hands. She was untidy, careless, particularly about exposing herself. She was given 38 injections, 17 of which culminated in severe reactions. Nearly each shock treatment was followed by improvement of the patient's behavior for the rest of the day, or for one or two days free from insulin. No durable therapeutic effects were obtained.

CASE 13.—E. K. Male, 19 years old.

Outstanding Features—Obsessional preoccupation with body weakness and losing manhood because of masturbation. Unwarranted laughter, while expressing depressive mood. Mannerisms: Apathy and periods of very pronounced motor restlessness. Habit deterioration. Duration of illness eight months. The patient was on insulin treatment for two months, during which he had 38 injections. He had severe reactions during 11 treatments. His behavior began to improve at an early phase of the treatment. He began to pay attention to his personal appearance, was in better rapport with the physician and personnel and took an interest in people and things around him. After nearly two months' treatment, he was sufficiently improved to leave the hospital. At the time of writing these notes (end of April, 1937) the patient was at home for two months trying to find work. At the last interview the improvement was found to remain unchanged.

CASE 14.—T. B. Male, 41 years old.

Outstanding Features—Habit deterioration. Posturing. Grimacing. Mannerisms: Laughing and talking to himself. Impulsiveness. Combativeness.

Lack of rapport—mute and not responding at any time. Duration of illness and hospitalization 19 years.

The patient received 17 injections, 12 of which were followed by severe reactions. The duration of the treatment was six weeks. The highest shock dose was between 50 and 60 units. Notwithstanding the intense reactions in each treatment, the therapeutic results were nil. It should be noted, however, that the patient had a relatively small number of treatments.

CASE 15.—O. G. H. Male, 26 years old.

Outstanding Features—Delusions of being doped. Passivity feelings. Incoherent and irrelevant talk. Hallucinations of smell and taste. Idea that the attendant is very close to God and some of the patients are connected with God. Habit deterioration. Duration of illness four years.

The patient has received 48 injections with 30 severe reactions. He responded with the usual reactions. We have noted some improvement with less scattering in his talk, greater cooperativeness in work about the ward and a feeling on the part of the family that he is very much improved.

CASE 16.—V. L. Female, age 32 years.

Outstanding Features—Delusions of persecution—there was a "plot to kill" her; someone was going to "crucify" her; in the hospital she saw two men "with murder in their eyes coming to kill" her. Suspicious of everyone —the doctor might be in a "frame-up" against her. Very poor contact—sitting quietly alone and answering questions by giggling and "no," "not exactly," "all right." At times perplexed, gazing around and moving her lips as if she were responding to someone. Habit deterioration—she refused to eat but swallowed food placed in her mouth, had to be dressed and undressed and sometimes soiled the bed-clothes and her own clothes. Duration of illness around sixteen months.

The patient was treated for one month during which she received 16 injections, with 14 severe reactions. She proved to be sensitive to insulin—the first injection of 20 units provoked very pronounced reactions. The highest shock dose which caused coma was 50 units. There was a favorable change in the behavior of the patient at the very beginning of the treatment, namely, after the second injection, which provoked marked reactions but no coma. The improvement rapidly increased and remained sustained throughout the course of the treatment. She helped with the routine work on the ward and to prepare various things for the operating room, readily joined in conversation, read occasionally, paid considerable attention to her personal appearance, ate well, played the piano and was cheerful with the nurses, patients and physicians.

At the time of writing these notes (end of April, 1937) that is, about three months after the conclusion of the treatment, the patient is at home, very much interested in her family, doing regular housework, taking up her usual social activities. For the last month she has been reemployed by the Federal Government to resume her former position as statistician, which requires rather intricate work and commands a high salary.

Summary and Comment.

I. Therapeutic Effects.

1. Out of our 16 patients treated with insulin a relatively complete remission was obtained in six patients and moderate improvement in four more. One patient (Case 2) remained in the hospital practically working as an attendant (work which he was doing before his illness), and after a three-month remission, relapsed.

This patient, when he got well, was anxious to get out from the hospital and go to work. We kept him for two reasons: first, there was no home for him to go to and no work could be found for him; second, we thought it advisable to keep him for observation. We are inclined to believe, however, that early discharge and favorable living and working conditions might have prevented him from relapsing.

Another patient (Case 3) remained outside of the hospital six weeks and did his usual work for a month, then he relapsed into a condition very similar to that which he presented at his first admission. Here again, we feel that the unfavorable environmental situation—namely, that the patient was not accepted into his own home and family but lived alone in a room—might have contributed to the relapse.

The four other patients in remission (Cases 1, 7, 13, 16) have so far (end of April, 1937) remained outside of the hospital and well, respectively, four months, three and a half months, two months, and about three months. It is interesting to note that in four out of these six patients (Cases 1, 2, 3, 13), the age is between 16 and 28 years, and the duration of their illnesses between five and eight months. In the two patients who relapsed (Cases 2 and 3), the duration of their illnesses was respectively seven and six months. The sixth patient (Case 7) who so far has remained well at home for three and a half months—the age is 32 and the duration of the illness is six years.

2. In six patients (Cases 6, 8, 9, 10, 12, 14), the therapeutic effects are nil. The duration of their illnesses is respectively 14 years, 7 months, 8 months, 17 months, 11 years, 19 years, and the respective ages are 60, 27, 18, 17, 36, and 41 years.

3. The improvement obtained in four patients (Cases 4, 5, 11, 15) has been so far maintained respectively 6 months, 3 months,

2 months and 2 months. The duration of their illnesses is 4 months, 6 months, 2 years, and 4 years and their ages are 16, 25, 24, and 26 years.

A further estimation of the therapeutic effects, as related to the duration of the illness, shows that out of six patients who had remissions, five were ill from 5 to 16 months. Whereas, out of six patients who had not benefited at all from the treatment, in three the duration of their illnesses was from 11 to 19 years and in the remaining three from 7 to 17 months. Thus, early cases appear to be somewhat more promising than old ones. Yet failures are not infrequent even in acute cases. So far, neither success nor failure of the treatment could be related to any grouping of parergasic reactions.

Beneficial therapeutic results evidently are not essentially determined by the length of the whole period of treatment or by the frequency of individual treatments. (Cases 1, 2, 7, 13 and 16.) These five cases show that improved behavior in the very early phase of the treatment, even before the patient shows significant reactions to individual injections of insulin, may forecast success of the ultimately completed treatment. There is no consistent relationship between quality and severity of reactions to individual treatments and therapeutic effects, nor is the relationship consistent between the therapeutic effects, the degree of the hypoglycemia and the amount of insulin used.

II. DOSAGE AND TOLERANCE TO INSULIN.

The shock dose in our patients varied from 25 to 200 units. It was determined by the patient's tolerance to insulin and by the type of reactions we were looking for.

There was no consistent relationship between the shock dose, the duration of the illness and the ages of the patients. In one patient the tolerance to insulin was markedly lowered in the course of the treatment. There was no consistent relationship between dose of insulin and degree of hypoglycemia.

III. DIFFICULTIES AND DANGERS ATTACHED TO THE TREATMENT.

One patient suddenly had a collapse of the cardio-vascular and respiratory functions which rapidly yielded to intravenous glucose and adrenalin.

Convulsions regarded as menacing symptoms occurred in four patients during several of their treatments. Because of hypersalivation, aspiration of saliva during the comatose state presents a danger.

Delayed hypoglycemic reactions occurred in three patients four to five hours after the termination of the treatments. Some of our patients were consistently hyper- or hypo-sensitive or intermittently hyper- or hypo-sensitive to insulin.

IV. PHYSIOLOGICAL AND PERSONALITY REACTIONS FOLLOWING THE INJECTION OF INSULIN.

The physiological reactions in our patients are fairly homogeneous, but there are individual variations. The personality reactions of our patients—in attitude, motility, speech—and particularly the content of their speech during the treatments, before they go into the comatose state and after they are aroused from it, show, all other conditions being equal, a much wider range of individual variations. Many patients showed evidence of moderate discomfort during the treatments. One expressed fear of death once on being aroused from coma. Only three patients, however, made any strenuous objections to repetition of the injections. Each patient throughout the individual treatments usually reacts along the same pattern. Yet the quality, intensity, sequence and duration of reactions, all other conditions being equal, may vary in the same patient in various treatments. There is no consistent relationship between kind and severity of reactions, degree of hypoglycemia, and dose of insulin.

Conclusions.

1. The insulin therapy for schizophrenia has in our 16 cases given results, which may be interpreted as encouraging.

2. Menacing reactions occurred infrequently and were readily averted by the immediate administration of intravenous glucose and adrenalin.

3. Most of our patients raised no serious objection to the treatment, usually had an amnesia for all except the initial manifestations of hypoglycemia (hunger, perspiration, dizziness, weakness).

FURTHER EXPERIENCES AT BELLEVUE HOSPITAL WITH THE HYPOGLYCEMIC INSULIN TREATMENT OF SCHIZOPHRENIA

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In the past eight months we have treated a total of 60 patients with insulin hypoglycemia at Bellevue. Of these, 50 were schizophrenic subjects and of these again, treatment has been completed in 30 cases. In three cases treatment could not be completed for special reasons. The method of treatment we employed followed Sakel's own as nearly as possible. We wish to gratefully acknowledge the ready help and advice Dr. Sakel and Dr. Dussik have given us on the occasions of their visits to Bellevue. Our results with the completed cases now stand as shown in Table I. According

TABLE I.

	Duration.			Duration.		
	½ yr.	½-1½ yrs.	Total	Over 1½ yrs.	Unknown.	Total.
Full recovery	7	2	9	2	..	11
Social recovery	3	3	6	2	..	8
Improvement	1	..	1	1	..	2
Negative	4	1	5	3	1	9

to our table we have had full or social recovery in 19 out of 30 cases.

In three incompletely treated cases we had one full recovery, one case improved and one unimproved.

In our second series of 17 cases now completing treatment, results promise to be at least as good as, and probably better than our first series. We regard these results as essentially positive and confirmatory of the reports by Dussik and Sakel, Max Müller, Kronfeld and Steinfeld, Frostig, Berglas and Susec, von Pap and others in Europe. On the basis of our experience we feel that the hypoglycemic insulin treatment is by far the best available treatment for schizophrenia.

This audience knows, however, that statistical tables in psychiatry are not always as eloquent as we would like them to be. If we examine our table again, there are several points which require some explanation. In the first place, the diagnosis of schizophrenia was made by members of our staff in the regular way, and only clear and typical cases were included,* the final judgment in these matters resting with the senior author (K. M. B.). The duration of illness in our cases was measured from the appearance of the first marked mental symptom. As you can see, we have had a relatively large proportion of cases of recent onset, and these again happen to be in young individuals. We have treated relatively few chronic cases of the type that fill our state hospitals, and the few that we have treated have not responded brilliantly. We have had our difficulties of course, in deciding on the date of onset in any one particular case, and these difficulties were especially marked in cases that had been out of touch with family and friends before admission, or where the family had no interest or insight into the patient's earlier behavior. The date of onset therefore often represents the date when the patient first began to become troublesome, and we could no doubt make a general revision of our groups of cases in the direction of increased chronicity without doing violence to the truth. On the other hand a few of our cases may have been incorrectly classified as chronic because they showed one or another peculiarity long before the outbreak of their psychosis, so that the date of onset of the first marked mental symptoms had to be placed further back. We might say that we have often had the impression that the so-called pre-psychotic schizoid personality of certain patients really represented an early insidious onset of the disease process. The tabulation of results, moreover, left room for differences of opinion. We have classified our results as nearly as we could into four main groups:

1. Complete recovery with full capacity for return to former work and no ascertainable defect.

2. Social recovery with capacity for work and without definite psychotic symptoms, but with some ascertainable defect on examination.

* One female case of acute onset recovered completely under treatment, but had some affective features and could not be regarded as a typical schizophrenic.

3. Improved cases, in some cases fit for discharge and with some capacity for simple work, but with definite psychotic symptoms.

4. Unimproved or only slightly improved cases. In some of these negative cases there was marked transitory improvement, or enough subjective symptomatic improvement to have made the treatment worthwhile.

We know that among our improved cases are some that would have improved without any treatment, and in one or two cases we actually saw remissions develop during the period of preliminary observation. However, we thought that if we were to make any comparison between the frequency of remission in treated and untreated cases, we would have to take into account all instances of remission which occurred for whatever reason in our treated cases. In practically all of our cases, however, the relation between treatment and improvement was close and intimate. Our patients grew calmer and more collected after their first injections, grew more lucid and accessible thereafter, and then began to show insight—at first during hypoglycemia and later throughout the day as treatment progressed. Some cases relapsed during treatment but were revived again and in all our cases we have had to fit our treatment to the individual and vary our procedure accordingly.

The average duration of treatment in recent cases was about six weeks, including rest days, with about 25 or 30 marked shock reactions, but some of our most striking remissions occurred within two or three weeks with relatively small shock doses.

We found that our maximum doses of insulin were comparatively high and we not infrequently used single doses above 200 units. In chronic or resistive cases the treatment was more protracted, but we have generally thought it best to conclude or suspend treatment after three months. In a few of our chronic cases we have witnessed an absolute resistance to insulin: these patients showed no marked reaction even to very high doses, and we have learned to regard this resistance as prognostically significant. In general the blander hypoglycemic reactions, with the development of a typical "wet" shock, seemed to be prognostically more favorable.

In a few cases the effect of treatment was simply to change the clinical picture without curing the disease. One of our cases for example emerged rapidly from a catatonic stupor soon after treat-

ment started, but remained paranoid and attempted suicide while on a visit home. In other cases the patient would pass through a transitional stage of paranoia or catatonic excitement soon after emerging from a stupor, while on the way to recovery. In following the course of such cases, one gets the impression that the catatonic state represents the more profound, and paranoia the more superficial physiological disturbance. We have found at any rate that the acute paranoid group, with elements of confusion, were the most promising material for treatment. Florid symptoms, so far as they indicated an acute process, were prognostically more favorable than bland and chronic symptoms which had already embedded themselves deeply in the patient's personality.

RELAPSES.

None of our recovered cases has so far relapsed, and the first of our discharged cases has already been well for six months. We have however, observed that such improvement as we have been able to achieve in chronic cases tends to be unstable, often lasting as long as treatment continues, but followed in some cases by a relapse to the former state soon after treatment ends. These patients have no resilience: the treatment seems to be supportive rather than stimulative to them and the organism cannot sustain the improvement after insulin is withdrawn. Whether continued insulin treatment is indicated in such cases remains an open question. Our own impression is that the insulin tolerance merely increases in these cases after a while, and they remain resistant to treatment.

Relapses during treatment sometimes occur and are of considerable practical and theoretical interest. We do not know whether it is better to increase doses, drop doses, or suspend treatment for a while when this occurs, and we have to be guided by more or less vague clinical considerations or by simple trial and error in any particular case. In one of our female cases, a relapse during treatment occurred coincidently with the menstrual period.

In recent cases we have sometimes observed continued improvement after the treatment was ended, especially after the patient was discharged. Such patients seem to need time before they can attain their equilibrium after they have been shaken by the treatment. And finally in all of our cases, we have observed over and over again

that psychological and emotional influences are important, and good results cannot be expected if these psychological factors are disregarded.

DANGERS.

We should like to say a few words about the dangers of the treatment. Epileptic seizures have been of rather infrequent occurrence in our patients and less than one-third of our patients have had them. Though we have had no fatalities in our series of cases, we do not underestimate the dangers of treatment.* We have so far, witnessed no cases of pulmonary edema, and none of our cases has ever developed a status epilepticus. We have seen two instances of hemiplegia following coma, both transitory, as well as three instances of transitory aphasia associated with right facial weakness. Of the thousands of hypoglycemic states which we have witnessed, we have seen but two instances of alarming vasomotor collapse; both of these patients were revived, though one of these remained in danger for several hours. This patient was a boy of 15, of asthenic build, who suddenly developed symptoms of collapse at 11 o'clock one morning, four hours after an insulin injection of 105 units:

> This started with a Jacksonian seizure involving his left side, followed immediately by the development of a thready pulse and a marked cyanosis which changed within about a minute to a grayish pallor. The patient was quickly given a sufficient amount of intravenous glucose to permit him to awaken and to swallow 300 c. c. of sugar solution (containing over 100 grains of sugar), after which he was able to mumble that he felt "O. K.," but within a few minutes he relapsed into coma and his pulse again grew weak. He was thereupon given a subcutaneous injection of seven and one-half grains of caffeine sodium benzoate and another 50 c. c. of 50 per cent glucose intravenously. His pulse improved but he remained in a coma. An hour had by now elapsed since the patient had been given the sugar by mouth, but he was still in coma and we felt that his condition was serious.
>
> At 1.15 p. m.—over two hours after the first collapse, and more than six hours after his insulin injection, the patient was given an injection of 50 c. c. of intravenous glucose to which he did not respond. The patient had by now

* One of our patients (J. J.) died at another hospital three months after his transfer and four months after his last insulin shock. The death occurred one evening three and a half hours after a tube feeding, and was sudden, unexpected and unobserved; no post-mortem examination could be made, and the cause of death remains unknown.

been given 120 c. c. of 50 per cent glucose solution by vein. Although there was no evidence of increased intracranial pressure, a spinal tap was performed and 15 c. c. of spinal fluid was drawn. Immediately afterwards the patient suddenly vomited in a projectile fashion a large quantity of clear gastric contents unmixed with bile. By this time we were beginning to feel rather helpless. We did not understand the patient's condition, and did not know what to do for him. And since we could do nothing, we knew of no reason why the patient should spontaneously revive. Under the circumstances we began to theorize: The quantity and color of the vomited fluid showed that the sugar solution had apparently not passed the pylorus, but had been practically fully retained in the stomach, and this suggested the presence of a pyloric spasm. On the assumption that a pyloric spasm indicated excessive vagus tone, we decided to administer both atropin and adrenalin. The quality of the patient's pulse was fairly good at this time; the rate fluctuated between 90 and 100, but at intervals the patient would grow extremely pale.

The patient was therefore again given 150 c. c. of a 40 per cent sugar solution by tube and at 2.15 p. m. was given 5 minims of adrenalin hypodermically. His color improved at once and in a few minutes he began to make occasional slight facial movements. He was thereupon given an additional .5 c. c. of adrenalin hypodermically, and at the same time 1/150 gr. of atropin. The patient's face grew flushed, his general appearance improved and he began to make slight resistive movements when tickled or pinched. He was thereupon given still another c. c. of adrenalin hypodermically and soon afterwards another 7½ gr. of caffeine sodium benzoate. Soon after this injection the patient again vomited a little. By 4 o'clock the patient was beginning to mutter. An additional 100 c. c. of 50 per cent glucose was administered intravenously at 4.35 p. m. The patient at this time was beginning to show a degree of restlessness which made it necessary to hold his arm, and he presented a general picture closely resembling a catatonic stupor. The patient's response to this final administration of intravenous glucose was excellent and in a few minutes he was fully aroused, though still markedly confused. His blood pressure at this time was 148/88. He looked vacantly about, made vague uncoordinated gestures, mistook a drinking cup for a urinal and was resistive and apprehensive when approached, though still very weak. He was however, by now out of danger and was fully recovered in a day or two.

Our impression is that this patient was saved by the adrenalin and continuously repeated intravenous glucose administrations, but an experience of this sort impresses us with our ignorance of what goes on in the organism during hypoglycemia. If the mystery of schizophrenia is now no longer impenetrable, it remains a mystery just the same, and we now have another mystery to place beside it—that is, the nature and mechanism of the schizophrenic's reaction to hypoglycemia. We are still far from understanding it, but we hope that this new problem will not be so hard to solve.

EXPERIENCES WITH THE HYPOGLYCEMIC SHOCK TREATMENT OF SCHIZOPHRENIA.

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Introduction

Our experience with the hypoglycemic shock treatment of schizophrenia, as described by Sakel,[1-3] Müller[4] and others, is, at this time, based upon 41 cases which have completed or are under treatment. This experience has brought before us certain facts which can be discussed under the headings of Physiological, Biochemical and Psychobiological observations, the description of which is the main object of this paper.

The interest stimulated by previous reports by Sakel and Müller of a high percentage of remissions makes necessary for comparison an evaluation of our clinical results. This is done reluctantly and with doubts as to the reliability of such data. Of the 41 cases, 31 have completed treatment. Eighteen (58 per cent) of these cases appear to have obtained a remission, in the sense of a freedom from psychotic manifestations and an ability to make a social adjustment. Four (13 per cent) cases are classed as showing a clinical improvement, and one of these, since returning home, has progressed to an apparent remission. Seven (22.5 per cent) cases are unimproved. Two (6.5 per cent) cases died.

Our experience so far suggests a more favorable response in men than in women. Of the 31 completed cases, 17 were men and 14 were women. Of the 17 men, 13, or 76.5 per cent, showed remissions, while of the 14 women, only 5 or 35.7 per cent were classed as remissions.

We feel that the report of results is presented without an adequate control series. The private cases under treatment were also given psychotherapeutic attention and made use of the opportunities for occupational and recreational therapy that a psychiatric division in a general hospital provides.

It is of interest to report that our cases at the Douglas County Hospital, where there is very little opportunity for psychotherapy,

occupational or recreational therapy, showed what has been termed a remission in 64 per cent in the completed cases. In private practice, the per cent was 54. As another attempt at control, the last 25 consecutive cases in private practice diagnosed as schizophrenic reactions and treated by two of us (G. A. Y. and R. H. Y.) before insulin therapy was started, showed a marked amelioration in psychotic symptoms in 32 per cent.

In reviewing our cases treated before insulin, it appeared to us that the amelioration was, in the majority of cases, less marked and improvement progressed at a much slower rate.

Material

Since early October, 1936, cases under our care have been selected from the private psychiatric wards of the Nebraska Methodist, Lutheran and St. Joseph Hospitals (18 cases) and from the psychopathic wards of the Douglas County Hospital (23 cases) for this treatment. Eli Lilly and Company generously supplied the insulin for the treatment of the County Hospital cases which was carried out under the immediate supervision of one of us (L. R.).

The age range of the group was from 16 to 47, the majority being in the third decade.

The duration of the illness was arbitrarily dated back to the time psychotic symptoms were first noticed by friends or relatives. Seventeen (55 per cent) of the cases were classed as of less than six months' duration; 10 (32 per cent), of 6 to 18 months' duration; and four (13 per cent), more than 18 months.

With regard to nosology, it should be stated that the attempt was made to interpret the total picture in these cases rather than to apply a diagnostic label. An evaluation of the behavior reactions presented revealed that the term schizophrenic or parergastic (A. Meyer) reaction type might be applied to the more prominent features of the illness.

Physiological Observations.

Certain of the physiological features of hypoglycemia are too well-known to include in this paper, and our discussion will be limited to the more variable features and to experiences that have received little mention.

SHOCK DOSAGE.

The dosage necessary to produce coma was quite variable, and unpredictable from an insulin tolerance test taken before treatment was instituted. In our series of cases, the shock dose producing coma varied from 40 to 165 units. The most common coma-producing dose was from 80 to 90 units.

A case who, during an insulin tolerance test experienced a gradual fall in blood sugar of 19 mgm. in 60 minutes to an intravenous administration of 2 units of insulin, later developed a coma on 50 units, which was complicated by a pulmonary edema. Another case, similarly tested before treatment, showed a prompt reduction in blood sugar of 33 mgm. in 15 minutes, but did not have a coma during treatment until 110 units were given.

BLOOD PRESSURE.

There has been an almost uniform rise in the systolic pressure, and some fall in the diastolic pressure to produce an increased pulse pressure during the shock period. However, on taking the blood pressure during the evening or on the rest days after the treatment has been in progress some weeks, we have been surprised to find a lowered blood pressure, and occasionally a systolic pressure between 85 and 100. In two of these cases of hypotension, we found a definite elevation of the N. P. N.

PULSE.

The tendency for little pulse change or a slight bradycardia was noticed during the early stages. After the first hour, the pulse rate has been slightly accelerated. Later in the coma stage, some change in pulse rate has been noticed, but most of the variation has been in the form of periodic acceleration. In the excitement stages, the pulse rate has been more rapid than in the other hypoglycemic states. Our findings are more in keeping with those of Müller, who found a tendency to increase in pulse rate during the shock period, while Sakel reported a bradycardia in most of his cases. Bradycardia has been observed by us, and in one case who failed to reach coma after four hours, there was a pulse rate of 44.

TEMPERATURE.

A low temperature has been a constant finding. Temperatures as low as 93.4 have been recorded, and drops to 95.+ are expected. An experience that has been repeated several times is the development of chill and subsequently fever, a short period after the interruption of a long deep coma. In one case, after a chill, the temperature rose to 104.0 F. and subsided over a period of several hours.

MOTOR EXCITEMENT.

In our cases, the excitements were only rarely associated with any overt manifestations of hunger. However, we have seen a patient eat his tooth paste during the early period of excitement. The sequence of events in our excited cases has followed closely the phases described recently by Angyal.[5]

Some patients would show excited features during the period the dose was being raised to coma-producing levels. However, some of our cases had good comas for a period of two to four weeks before showing any evidence of the excitements. It is our impression that the cases that developed severe motor excitements and tonic spasms during hypoglycemia do not show such good clinical results.

CONVULSIONS.

In our cases, convulsions were encountered in 16 per cent of cases. Usually the convulsions were preceded by twitchings and jerkings of muscle groups, but occurred without any warning, as well. In one case there was a right-sided seizure that developed after coma had been interrupted by the giving of glucose orally. We do not consider convulsions to be of unfavorable prognostic significance.

OTHER NEUROLOGIC SIGNS AND SYMPTOMS.

Although no hemiplegias were encountered, the usual assortment of neurologic signs in hypoglycemia were observed. During the different stages nystagmus, bilateral Babinski, clonus, marked pupillary variations, and areflexia have been observed.

Biochemical Observations.

Biochemistry studies were made in our cases because the induced hypoglycemia provided an excellent opportunity for observing the associated chemical changes. It was thought that the humoral changes might give additional information that would aid in interpreting behavior and offer a possible prognostic guide. Georgi,[6] in a study of the biochemical aspects of insulin shock treatment, felt that there was a certain relationship between the humoral and the behavior changes. It was his belief that the improved cases had a normal potassium calcium ratio and slight daily variation of the ratio. After conclusion of treatment, the improved cases showed a high potassium level. The cases that did not improve had a low potassium calcium ratio and a great daily variation of the ratio.

These studies were begun with a realization that a certain fogginess surrounds the biochemical status of the schizophrenic in the literature. As in the case of the biochemical reactions to insulin, there have been a variety of results reported. The impression is obtained that there may be a somewhat greater variation from the normal range in schizophrenic than in normal individuals.

SUGAR METABOLISM.

The blood sugar curves during treatment were essentially as reported by Sakel. The drop in blood sugar occurred early in the treatment, and remained at a fairly constant level during the periods of stupor, excitement or coma. Frequently, the blood sugar would rise slightly during the period of coma. During coma, the blood sugar levels would usually range from 30 to 55 mgm. per cent, although levels above and below these figures were obtained.

MINERAL METABOLISM.

A study of the mineral metabolism was undertaken by the Department of Biochemistry and carried out by a graduate student, Mr. William Osheroff, under the supervision of Dr. S. Morgulis. Because of the variation in intensity of the hypoglycemic reaction on different days, it was felt that the blood could be obtained under more nearly basal conditions when taken in the morning before administration of insulin. The blood was taken on a group of pa-

tients before treatment, during Phase I, usually on several occasions during Phase II, and occasionally during Phase IV.

Owing to a lack of funds and availability of well-trained workers in chemical analysis, a more complete study of mineral metabolism could not be made. The serum potassium, sodium, calcium, magnesium, phosphorus and chlorides were studied at the intervals stated. In all of the estimations except the chlorides, a probable error is admitted due to concentration of the serum in the hypoglycemic state.

Potassium.—Many of the blood specimens could not be used for the potassium determination, due to a very slight hemolysis which would occur in spite of great care being taken in collecting the specimen. A study of our cases to date would indicate that there is a definite tendency toward increase in the potassium during the second to ninth week of Phase II.

Sodium.—Except for two cases which showed a transient rise in the sodium during Phase II, there was little remarkable change in the sodium.

Calcium.—There seemed to be a tendency for the calcium to increase in certain cases at about the second week of Phase II.

Chlorides.—Most of the chloride readings during Phase II run at a low normal. Study of the individual cases shows a tendency for the chlorides to drop during Phase I, but particularly during Phase II.

Magnesium.—There was little significant change in the serum magnesium.

Phosphorus.—In our series there was little change, although mineral analyses done during periods of hypoglycemia revealed a low serum phosphorus.

Non-Protein Nitrogen.—Because of the tendency towards a high potassium and low chloride in the serum during the Phase II, the possibility of a reactive hypoadrenalism was considered. In certain cases, a low blood pressure of 85 to 100 systolic was found in the evenings, which supported this belief. As a result, N. P. N. determinations were run, which showed a definite elevation in two cases with a low blood pressure.

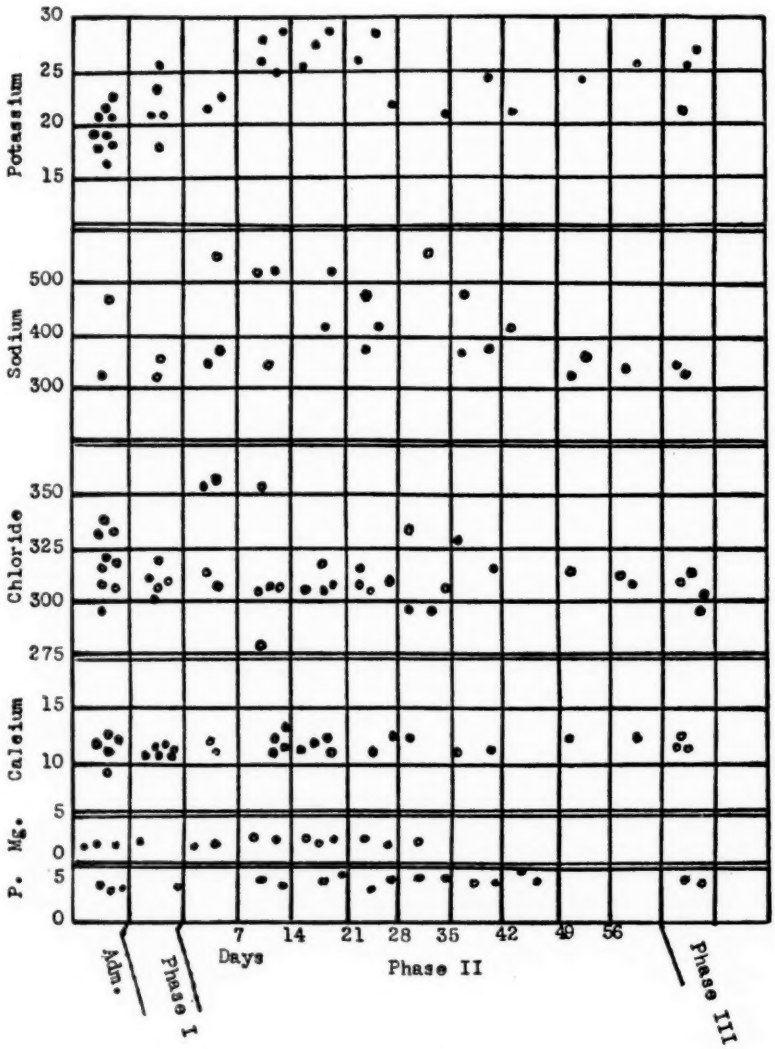


FIG. 1.—Results of Mineral Analyses on Blood Serum Taken in the Morning Before Administration of Insulin at Intervals During the Period of Treatment.

Psychobiological Reactions.

In over a half of our cases there occurred an amelioration of the psychotic features of the personality maladjustment. This was shown by the loss of delusions and hallucinatory activity, the appearance of lucidity and insight, a release of affect, and the establishment of rapport and interest. In many of the cases, these developments took place early in the treatment. This is well illustrated by the following case:

A young, single, man of 22, a government stenographer, following several years of tension over a masturbation problem, became convinced he had a remarkable ability to produce orgasms in young women at a distance. He then rationalized this power by concluding he was a reincarnated Christ, gave away his money and belongings and went to Florida to find his mission. Because of his great powers, he thought he was in danger from evil men. He was picked up in Florida and returned to Omaha. The evolution of the psychosis, through a sequence of erotic fantasy, philosophical ruminations, sexual projections, and delusions of grandeur and persecution, covered some three years, though his overt behavior disorder appeared in September, 1936. Ten days after treatment was instituted, he had his first complete coma. That afternoon, he wrote a description of his condition, showing insight. He said he had lost the idea of influencing others, and that while he remembered fully his thought of being Christ, he now realized he was mentally sick. From being restless, picking at his fingers, and smiling inappropriately, he had become friendly, talkative and cooperative. Two weeks later, Phase IV was commenced.

There are certain manifestations during the course of treatment that deserve special consideration.

Expansion of Mood.

One of the more outstanding features is expansion of mood. This may at first occur during the hypoglycemic states prior to coma or during the awakening. Before coma, it is often accompanied by marked psychomotor excitement. The patient becomes euphoric, laughs, makes facetious remarks, is jovial and talkative. During this phase, they may also relate in a carefree manner emotionally traumatic incidents that apparently have a relation to the conflicts underlying the psychosis. One married patient, while euphoric, told of a sexual perversion, cunnilingus, the attempted practice of which with his wife had signalized the onset of the psychosis. As the treatment goes on, this elevation of mood is noticeable in the

hypoglycemia free period, though in less pronounced form. We have the impression that its appearance is, on the whole, of good prognostic significance, and that it is important because it presents an opportunity for a psychotherapeutic approach to the problem.

DEPRESSION.

Depression has manifested itself during treatment in four cases in an accentuated form, after a subsidence of more clearly defined schizophrenic symptoms. The patient with a cunnilingus conflict mentioned above, who had been in a state of catatonic stupor for six months, after a period of about ten days of sociable genial activity, became depressed and experienced auditory hallucinations of admonitory type.

PREOCCUPATION WITH DEATH IDEAS.

A number of patients have expressed marked concern over ideas of death, on awakening from coma. The statement has been made frequently by patients on awakening that they had felt as though they were far away and that it would be impossible to get back. Sexual conflicts have been much in evidence in the history of these cases.

EFFECT OF TREATMENT ON EXCITEMENTS.

Catatonic excitements have been uniformly and quickly relieved by the treatment. The following case may be cited:

J. B., age 27, laborer, who had had two previous attacks (at 16 and 24 years of age, respectively, the latter requiring hospitalization for months), three days before hospitalization became abnormally quiet, abstracted and confused. The day before, he became noisy and violent. Upon admission, he was at first unresponsive and depressed, but the day after was noisy and violent. He became progressively disturbed, ill-natured, combative, destructive of bedding and clothing; would stand nude in his room; smeared his person and room walls with feces; at times would stand in one position for hours. His talk was senseless, incoherent, profane and obscene. Seven days after the beginning of his treatment he was given 100 units. There had been so far no shock and no noticeable improvement. During the resulting hypoglycemia, he became responsive to questions and told the physicians he was there because he was "nuts." Coma occurred and was repeated daily. A week later, he was quiet and cooperative, and mingling freely with the other patients.

EFFECT OF TREATMENT ON DIFFERENT REACTION TYPES.

While it is impossible to divide the schizophrenic reactions into clear-cut types, there have seemed to be some schizophrenic features that have responded more readily to this treatment than others. Our cases with features which have been classed as catatonic excitement perhaps showed the best response. The acute schizophrenic reactions with paranoid beliefs and hallucinatory activity seemed to respond well. Our cases with stupor have shown improvement, but no clear-cut remissions. Those cases which had depressive features did not seem to do well with this treatment. The cases which showed features classed chiefly as hebephrenic did not seem to be as favorably influenced as other types.

Discussion.

We believe the hypoglycemic shock method to be a type of treatment that provides an attack upon the schizophrenic problem at a physiological level, and a type of treatment that is essentially non-specific in type. Like all non-specific therapy, the treatment is efficacious when it is applied to a disease which is not fixed and chronic in nature. Where the disorder is largely acute, labile, and of an "attack" nature, then a type of non-specific therapy may be efficacious in relieving symptoms.

The physiologic changes observed appear to be those of strong parasympathetic stimulation with a compensatory sympathico-adrenal activation. In addition, we have in occasional cases observed what we believed to be a secondary hypoadrenalism during Phase III and Phase IV. The biochemical facts show suggestive changes that are of no prognostic significance to date. The changes in mineral metabolism are, in some cases during periods of rest, similar to those found in a hypoadrenalism.

Because of the integration of the individual, changes in vegetative and biochemical functioning would naturally be reflected in the higher psychobiological levels of functioning. In the majority of our cases, there has been a change in behavior, and in over half, the change has been in the form of amelioration of psychotic symptoms to the extent that they were classed as remissions.

As a result of our experience, this type of treatment appeals to us particularly in young, robust males, whose schizophrenic reac-

tion is of short duration. We feel very definitely that the treatment is dangerous in type and demands close observation. In our group of cases, the two deaths were at the Douglas County Hospital, where the opportunity for close observation is not the same as in private practice. One woman of thirty-seven, after her ninth coma on 50 units, died with a pulmonary edema that developed shortly after the termination of a coma. The second case, a man of thirty-seven, badly deteriorated, with a long-standing schizophrenic reaction, shortly after the interruption of his tenth coma, complained of severe upper abdominal pain, vomited, quickly went into a circulatory collapse and died. While there was no autopsy, the cause of death was thought to have been a coronary thrombosis. In addition to the two deaths, a woman of 42 developed a pulmonary edema on 50 units, from which she almost died. A fourth case, a young woman of 22, went into a status elipticus four hours after termination of her ninth coma. The next day she developed hyperpyrexia, 106. F, a pulse rate of 170, and pulmonary signs. Her condition responded promptly to intravenous administrations of 5 per cent glucose in normal salt. It was noted that her blood chloride checked the morning after the convulsive state was low, 275 mgm. as compared to an average of 325 mgm.

Conclusions.

Hypoglycemic shock treatment has been given to 41 schizophrenic patients since October, 1936. Thirty-one cases have completed treatment, of which there has been an amelioration of psychotic symptoms in 58 per cent.

Physiological, biochemical and psychobiological facts observed in the course of treatment are reported.

The dangers of the treatment are emphasized by the report of two deaths and serious complications in two other cases.

It is believed that this type of therapy deserves a place as an adjunct in the treatment of schizophrenia because of its ability to produce rapid change in behavior, and because of the opportunities for other types of treatment that present themselves with this change in behavior.

The hypoglycemic shock treatment seems to be more suited for robust, young males who are experiencing a schizophrenic reaction of short duration.

No attempt has been made to discuss possible mechanisms that might be responsible for the favorable behavior changes observed.

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THE EFFECT OF THE HYPOGLYCEMIC THERAPY ON THE PSYCHOTIC PROCESS.

By BERNARD GLUECK, M. D.

In place of a formal paper on this important subject, I shall confine my remarks to a brief consideration of two aspects of the question we have been discussing this morning. The first of these concerns one of the immediate and direct effects of the hypoglycemic therapy on the psychotic process or state. While what I have to say is in the nature of a clinical impression and not the result of any deliberate research, it is based upon the clinical observation of a fairly large number of cases treated by others and of 32 patients treated at Stony Lodge under my personal supervision.

Now, neither by nature nor by training or experience am I to be classed as a technical research or laboratory worker. For a considerable number of years now I have been active in the field of psychiatry as clinician and therapist, and have depended for carrying on this work to a very large extent on such equipment as is embraced within my own personality. I work in a setting of a small private hospital, well equipped for dealing with mental disorders but essentially depending upon techniques which might be termed interpersonal relationships in which one human being attempts to influence another human being's health and behavior. Now it is a well-known fact that this type of procedure is commonly hampered and interfered with by certain attitudes and reactions in our patients which render a helpful interpersonal relationship difficult or impossible. I am referring to patients' tendencies to isolation and withdrawal, to reactions of antagonism and resentment, to the anxieties, fears and delusional complexities which render these people inaccessible to the kind of relationship between patient and physician which is indispensable for a helpful therapeutic approach. The thing that has impressed me most deeply and most dramatically at times about the insulin therapy is its direct and frequently very rapid effect upon the patient with respect to these attitudes of isolation, aversion and suspicion. What is technically termed a transference capacity is, at times,

released in a most convincing and dramatic manner very soon after the introduction of the insulin therapy, rendering patients who had hitherto been utterly inaccessible to any psychological influence, quite approachable and capable of benefiting from the various services which the hospital offers.

For very definite reasons I do not wish to speak of ultimate results, but these immediate effects upon the psychological attitudes of the patients cannot be overstressed.

Another significant and very impressive manifestation of a psychological nature is to be observed frequently at the time when the patients are entering upon a state of remission. It is most impressive to note how some of the patients struggle against the necessity of getting well; how they resist and resent the force which is driving them towards a greater recognition of reality and an adjustment to its demands. Sometimes this resentment is very clearly and unmistakably expressed in the patients' insistence that they do not wish to get well; that they never asked to be made well; that they want to remain ill just as they were, etc. Occasionally this reaction to a pull towards an unwished for recovery is reflected in a profound emotional depression, sometimes accompanied by a rather intense suicidal drive.

As one's experience with the effects of the hypoglycemic therapy increases, one comes to doubt increasingly the validity of many of our notions concerning the question of deterioration in dementia præcox. We have already observed quite a number of manifestations which have been considered in the past as irreversible end-phenomena of a deteriorating process, entirely disappear and leave no trace of any sort behind them. On the other hand, impressive as is the psychological aspect in connection with the insulin therapy, patients are observed in whom no need whatsoever exists for any kind of aid to recovery outside of the actual effect of the hypoglycemic state.

Thus, one very excited catatonic boy recovered completely, and has been well now for several months, after only three insulin shocks. On a former sojourn in the hospital, some three years ago, with a similar condition, it took a number of months before a remission was attained.

But it would be entirely fallacious to assume that either the physiological effect of the insulin therapy, or the improved oppor-

tunity for psychological therapy which this effect brings with it tells the entire story as regards the nature of the forces at work in this therapy. More so even than formerly, experience with the insulin therapy has demonstrated the great significance for the destiny of the schizophrenic of his hereditary background and so-called constitutional make-up. Perhaps in the final analysis, this is still the most determining factor, since the outcome of the struggle between the forces which pull the patient in the direction of illness, and those which as result of the therapy force him to an emergence from the illness, depends in the final analysis upon the individual's capacity for mastering instinct and impulse on the one hand, and environmental life vicissitudes on the other hand. Of great significance also are the conditions under which the patient is obliged to work out his convalescence. Recovery from a biochemical approach ordinarily takes place without an adequate personal preparation of the patient for such an event, in contrast to what takes place in connection with the psychological form of therapy. The patient, therefore, is much more vulnerable to certain deleterious influences than he would be if he had been gradually prepared to meet the issues of a normal life. Some of the relapses which we have encountered might definitely have been avoided had not our enthusiasm over the recovery of a patient who had been given up as hopeless led us to an unjustifiable degree of indifference concerning the conditions of the patient's convalescence.

So much for the clinical aspects of this question.

I would like to have permission to refer briefly to the Round Table Session of last evening, which was exceedingly well attended by an enthusiastic body of our membership. It was clearly demonstrated at this meeting that there is a great need for some central source of reliable information concerning the nature and technical details of this mode of approach, and while the active participation in this movement by the New York State Department of Mental Hygiene has helped materially in this direction, it was suggested by many that The American Psychiatric Association might help to organize some sort of nucleus from which this information might issue.

THE PROBLEM OF INSULIN SHOCK.

By HENRY J. JOHN, M. D., Cleveland, Ohio.

The problem of insulin shock in the treatment of schizophrenia has made us clinicians dig out some of our old studies and observations in an attempt to elucidate and evaluate the problem from purely clinical and laboratory angles. As I have listened to the excellent papers given here, many of my former observations and data came to my mind, for the study of blood sugars under various conditions has interested me intensely for the past sixteen years.

Drs. Kepler and Moersch have given an excellent classification of the hypoglycemias. I shall try to illustrate some examples of these groups from my old records.

The question of induced hypoglycemia I reported 12 years ago, in 1925, at which time I attempted to call attention to a syndrome simulating hyperthyroidism which was due merely to a continued overdosage of insulin. I gave it the name of hyperinsulinism at that time merely to emphasize it. Briefly the story was as follows: A man 38 years of age was told he had diabetes when glycosuria was found at life insurance examination. He was immediately overdosed with insulin and developed signs of nervousness and tachycardia which were interpreted by his physician as a condition of hyperthyroidism. He was sent in for thyroidectomy. I found him not to be diabetic, took the insulin away and the symptoms subsided.

Insulin then was a new gadget and I was anxious to impress on the profession the fact that an overdosage over a long period of time can create a picture resembling hyperthyroidism.

In 1927 I reported a similar case in a surgical journal. This case also was getting too much insulin when no insulin was needed and he had the classical symptoms simulating the picture of hyperthyroidism. In fact this man had already had two ligations done before I saw him. At this time I began to feel quite keenly about arousing the surgical profession to this picture since such cases were not being sent to the internist but to the surgeon for thyroidectomy.

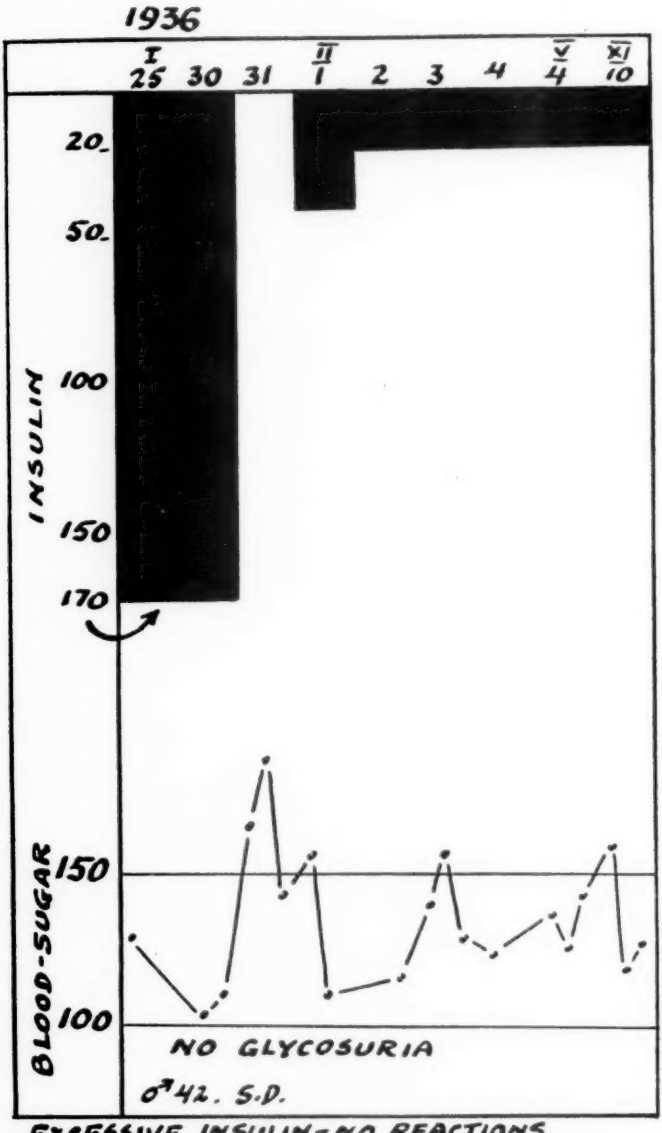

1936
I 25
30
31
II 1
2
3
4
V 4
XI 10
20
50
100
150
170
INSULIN
150
100
BLOOD-SUGAR
NO GLYCOSURIA
♂42. S.D.
EXCESSIVE INSULIN-NO REACTIONS.

CHART I.

However, not every case receiving an overdose of insulin will manifest insulin reactions. In Chart 1 I drew graphically the data on a man 42 years of age who, when I first saw him, was taking 170 units of insulin a day, never had a reaction, when he actually needed but 20 units a day as you see from the chart.

Another patient about 50 years of age, whom I discharged on 20 units of insulin twice a day, was taking by mistake 200 units twice a day for a whole month, was in a constant reaction and at the end of the month all insulin was discontinued.

Or in the case of a little girl five years of age, whom I gave 100 units of insulin intravenously in the morning and 100 units intravenously in the evening for a whole month, and during that time she had no reaction and her blood sugar did not drop to a particularly low level.

We can induce hypoglycemic reaction often by a large dose of insulin but frequently a large dose will not elicit such symptoms. There must be a marked individual variation in different people, for I have seen patients very sensitive to an increase of but two units.

Insulin reaction does not always occur during a state of hypoglycemia. I have seen reactions with a blood sugar as high as 360 mg. per cent. These are exceptions, of course, but they do occur.

The first time I learned what an insulin reaction was like was in 1921 when I was doing a series of glucose tolerance tests on myself studying the stability of the curve. Chart 2 shows that in one of these tests, at the third hour, my blood sugar dropped to 35 mg. per cent at which time, as I looked at my original notes, I had put down: (1) Feeling of fainting away; (2) Extreme hunger; (3) Marked perspiration; which are the cardinal symptoms of hypoglycemia. This is a physiological type of hypoglycemia.

In true hyperinsulinism where we deal with a condition of a tumor of the islands or else their hypertrophy, I feel that it is only surgery which helps. But this is the only surgical group in the lot. In 1931 I reported a case of a physician 61 years of age who had diabetes, hyperthyroidism, cirrhosis of the liver. In five months I could discontinue all insulin and a year later he died following a hypoglycemic shock. At post mortem we found a hypertrophy of the islands.

A hepatogenous type of hypoglycemia I have not seen or else failed to recognize, but a hypoglycemia due to destruction of adrenals you can follow from Chart 3. This was a young man 20 years of age with hyperthyroidism and diabetes. It took 60 units of insulin a day to keep his blood sugar level around 200. There was a marked drop of blood sugar following the first denervation but it came up quickly. When he had the second denervation of

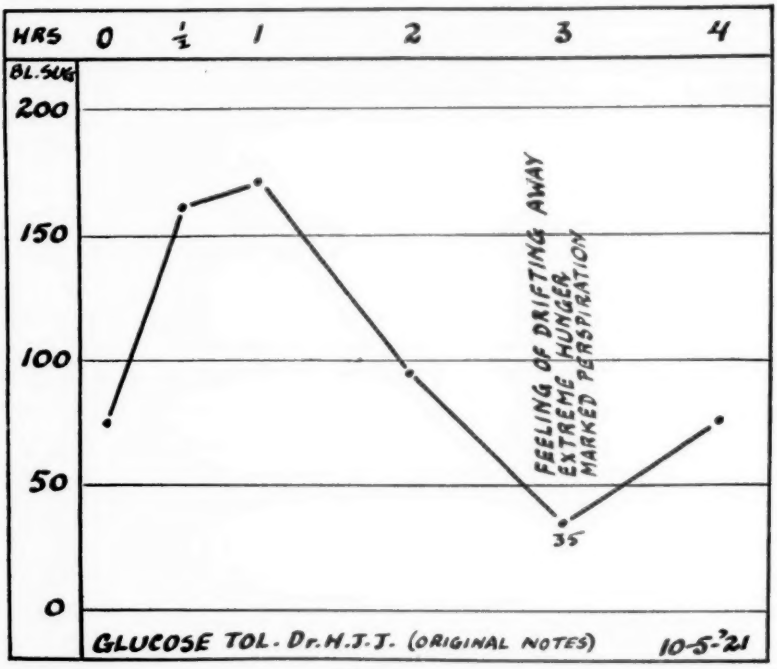


CHART 2.

adrenals five weeks later there followed an abrupt drop of blood sugar and the man died. A post mortem cleared up the picture for the first adrenal was completely fibrosed, thus inactive, and the second adrenal had acute hemorrhagic necrosis which put it out of function and you can see how the blood sugar level was changed thereby.

We also see occasionally a condition which resembles petit mal from over-dosage of insulin which clears up when insulin is properly adjusted and hypoglycemia eliminated.

There are many people who carry a marked hypoglycemia and have no symptoms. In 1928 in my enthusiasm to call attention to this fact I analyzed 22,808 blood sugars taken on patients during routine examination, all below 120 mg. per cent. I was anxious to show that a blood sugar below 60 in a nondiabetic was not as rare a finding as it was thought to be. Over 200 were below 60, some

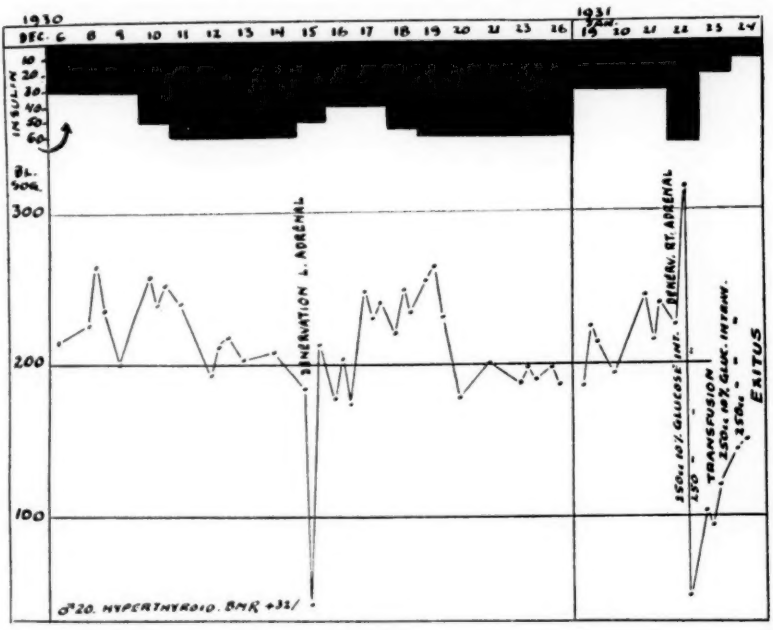


CHART 3.

of them as low as 30 mg. per cent without symptoms of hypoglycemia.

I have brought out some of these facts merely to emphasize what had already been said. Some years ago, in 1930, I had what seemed to me a typical case of hyperinsulinism or rather chronic hypoglycemia, with nervousness, sweating, loss of weight, weakness and even spells of unconsciousness. Her blood sugar level ranged between 47 and 84 at meal times, and it was probably considerably lower between times. I conceived the idea of treating her with insulin, 10 units three times a day half an hour after meals in an

attempt to give the pancreas a " physiological rest." And the result was a most remarkable and quick improvement and finally a complete cure with a heightening of the blood sugar level. Since then I have employed this method at least a dozen times with good results.

Now all this discussion leads us to realize that there is a tremendous variation in individuals. To give a five-year old child 100 units of insulin intravenously morning and evening for a whole month and have no reactions and then to produce a reaction by a mere increase of two units in a grown up shows what a tremendous difference there is in an insulin-reaction-threshold in various people. This you will meet with I am sure in the group of cases of schizophrenia you are treating. There cannot be a hard and fast rule as to the dosage, a fact which has been already pointed out. Each case has to be evaluated on its own merits. The thing which impresses me tremendously is the relatively good result obtained in this therapy.

I can't discuss your results. They speak for themselves. To salvage large numbers of human beings who thus far were lost to the world is an achievement before which even the greatest skeptic must bow in reverence. The risk is apparently not great as the low mortality indicates. But were it 10 times as high it would still be a great achievement. I feel that Dr. Sakel and the men who worked with him have done a truly fine piece of pioneer work and have shown the way. Time, energy, care and enthusiasm, tempered by judgment of hundreds of others should clear up the byways and perhaps simplify the procedure in time, for all great achievements in their final analysis are reduced to simple procedures.

DISCUSSION ON HYPOGLYCEMIA SYMPOSIUM.

DR. JULIUS STEINFELD (Peoria, Ill.).—In Dr. Michell's institution, during the past nine months, I have treated (in collaboration with Dr. Burton) eighteen cases. Sixteen were schizophrenics, two manic-depressive. Six of the sixteen schizophrenics have been discharged with four of them showing full recovery, two were greatly improved. If the remaining ten cases, two are about to be discharged. Cases having recurrent attacks, even over a period of years, show better results than those constantly ill for shorter periods. We rather prefer giving larger doses of insulin for shorter hypoglycemic periods, than smaller doses for longer periods because our experience shows that the latter is more exhausting and dangerous for the patient. On some patients who did not show the desired response to insulin, sudden changes were obtained after convulsions produced either by insulin or metrazol.

DR. G. HEILBRUNN (Elgin, Ill.).—The treatment has just been completed on a group of 13 patients in Elgin State Hospital. There were 8 cases of a duration up to 1 year, 6 of them were paroled home, 1 showed marked improvement and 1 did not improve at all. Five had a duration of between 4 and 8 years, 1 has shown improvement while the other 4 remained unchanged. I found from my experience in Switzerland that 70 per cent of the patients showed such a sensitization to insulin that the initial shock dose could be reduced by an average of 40 per cent. A decrease of the blood sugar level below 60 mg. per cent seems to be necessary for the development of a clinical reaction. The appearance of severe hypoglycemic symptoms has been found to be a function of the rapid decrease of the blood sugar, requiring an average of 60 minutes, and the maintenance of a level of 30 mg. per cent or lower for at least an average of an additional 60 minutes. The sedimentation rate of erythrocytes remains approximately the same; the potassium level decreases but shows an elevation in the passing weeks. Calcium exhibits less variations. Cholesterol shows an elevation and lowering without any relation to the clinical picture. Electrocardiographic readings showed arrhythmias of minor significance, lowering of ST, flattening and sometimes negativity of the T wave, widening of the Q. R. S. and occasional appearance of U waves. All heart changes are reversible, however. Three patients had two epileptic seizures each, without any therapeutic influence one way or the other. We did not interrupt the seizure with adrenalin or intravenous glucose. We allowed the seizure to proceed, and when the patient was relaxed, he was fed through the nasal tube in the usual manner.

PRESIDENT CAMPBELL.—In view of the late hour, there will be no general discussion, but I should like to give Dr. Sakel an opportunity to sum up, or to make any comments on anything that has been offered.

DR. MANFRED SAKEL (closing).—I have a few words about the epileptic seizure, because I consider it very important. Certainly the danger of epileptic seizure was a little bit overestimated, but only a little, and it depends on the time when the patient went into an epileptic seizure. We have two kinds of epileptic seizure during hypoglycemia. The first is in the so-called dry shock. It appears about an hour or a half hour or two hours after giving the glucose. This is only one kind of reaction of the patient—this epileptic seizure is not a dangerous one and you can wait a few minutes and terminate it with a nasal tube. It is better if you don't give adrenalin, because I don't like to give it in most cases. If the epileptic seizure happens after three or four hours and happens after the patient is in coma, it is a signal of danger. This second type of epileptic seizure is very dangerous and I would regard it as an indication to terminate with intravenous glucose at once.

The first, so-called dry shock, is not so bad, but the second is a sign that the patient has achieved the greatest possible border of danger.

PRESIDENT CAMPBELL.—I should like to thank you, Dr. Sakel, formally in the name of The American Psychiatric Association for having come before us to present your recent work which has such a very great interest for us and such a great importance for our patients.

This terminates the formal scientific session.

THE ELECTRENCEPHALOGRAM OF SCHIZOPHRENICS DURING INSULIN TREATMENTS.

THE "DELTA INDEX" AS A CLINICAL MEASURE.*

BY HUDSON HOAGLAND, PH. D., D. EWEN CAMERON, M. B., AND MORTON A. RUBIN, PH. D.,

Worcester, Mass.

INTRODUCTION.

In another paper[1] we described the behavior of electrencephalograms during individual insulin treatments of schizophrenics (see also (2)). A new measure of waves longer than alpha waves of the electrencephalogram, called the "delta index," was devised and studied as a function of blood sugar and alpha wave frequency (Berger rhythm) during insulinization and recovery. Our electrencephalograms have been recorded with a resistance-coupled amplifier and ink-writing undulator on paper tape. The electrodes were wires attached to lead pellets 2 to 3 mm. in diameter, the pellets making contact with the scalp through electrode paste and held in position by collodion. The grid electrode was placed over the occiput, 2 cm. above the inion, and an "indifferent" electrode was attached to the skin behind each ear, parallel leads from these last attachments being brought together to form a common connection. Our tape speed has been 27 mm. per sec., our amplification 10 microvolts = 1.5 mm. and our "time constant" 0.2 sec. (but see (1) for the effect of line impedance on our amplification standard).

The delta index is obtained by selecting a "typical" 100 cm. length sample of tape and, within this length of record, drawing a line through the mid-regions of *all* waves equal to or less than the

* From the Biological Laboratories, Clark University, and the Research Service of the Worcester State Hospital.

This work has been aided in part by a grant from the Rockefeller Foundation.

We are indebted to the Lillie Co. for generous supplies of insulin used in treating our patients.

characteristic alpha waves in duration. The pencil line is run *over* crests and troughs of all waves longer than alphas (*i. e.*, in general, all waves greater than 0.1 sec. in duration). The resulting curving line (see Fig. 3 of (1) and also Fig. 3 of this paper) is then measured with a map measurer and the difference in cm. between the length of the curved line, as read from the measurer, and 100 cm. is defined as the delta index. The delta index, in cm. per cent, is a function of the excess voltage produced by all waves longer than alpha waves. Students of the electrencephalogram have observed that sleep, anæsthesia, and other conditions of impaired consciousness result in the augmentation of what might be referred to as "base line wobble" caused by an increased number of slow, more or less random waves.[3] Walter [3a] has found a predominance of these slow waves associated with brain tumors and he has called them delta waves. It is essentially this slow wave excess, producing a disintegrated or broken-up appearance of the record, which the delta index empirically measures. In general, the delta index is referred to for convenience as the D. I. We have observed that not only does the D. I. move more or less reciprocally with blood sugar during insulin treatments but that (a) it is usually less after a treatment than before and (b) untreated schizophrenics tend, on the *average*, to show slightly higher D. I.'s than do other persons.

In the present paper we shall first consider the electrencephalogram as a clinical means of assessing the value of a given treatment. We shall then compare D. I.'s in untreated schizophrenics and in normals and then pass on to what is probably the most interesting aspect of the work, the use of the D. I. as a quantitative measure of an individual patient's condition from day to day and week to week.

Clinical Applications of the Electrencephalogram.

In the insulin treatment of schizophrenia an objective measure of progress is important on two counts. The first consists in the fact that the condition of the patient during hypoglycemia is difficult to assess on the basis of simple clinical observation. The second is the difficulty of estimating in a given patient from day to day the comparative severity of the schizophrenic reaction

itself. The electrencephalogram, and in particular the D. I., has yielded considerable objective information in the following situations:

(*a*) *During Actual Hypoglycemia.*—In the course of any given insulin treatment the question occasionally arises whether the patient, after several hours' treatment, is going to progress on into coma or whether there is likely to be a spontaneous recovery from hypoglycemia. We have repeatedly found that the "broken-up" appearance of the record decreases and, less conspicuously, the alpha frequency rises prior to remissions from coma. This applies both to spontaneous remissions (*cf.* Fig. 4 of Hoagland, Rubin and Cameron [1]) and also to remissions produced by injected sugar. These oscillogram changes occur often minutes before clinical signs indicate that the patient is beginning to recover from hypoglycemia. Since one of the most important principles of insulin treatment consists in correct assessment of the patient's condition at the time of interruption, we have found these observations of value. We have not, however, been able to gauge the actual depth of coma from the appearance of the record save to a degree which is rather rougher than that attained by examination of his pupillary and tendon reflexes. In general, it may be said that the record tends to become rather more broken-up the deeper the coma. The broken-up appearance, however, begins to show often as long as an hour before coma can be considered present clinically. We had hoped that the electrencephalogram could provide us with a means of detecting the imminence of convulsive seizures. Unfortunately we have never happened to be taking records while seizures occurred. We have, however, frequently taken records during the clonic jerking which frequently precedes the onset of coma. Since the actual hypoglycemic seizures are almost invariably preceded by these clonic jerkings and often indeed appear to be simply a marked intensification of them, we have been particularly interested to note whether the "spike and wave" formation described by Gibbs, Davis and Lennox [3] as associated with the seizures of *petit-mal* epilepsy could be detected during these clonic jerkings. We have been unable to recognize them in our records, although with our occipital lead they may well have been missed. The phenomena may be basically of a

different nature from *petit-mal* epilepsy. We have not found any qualitatively characteristic wave forms in schizophrenics.

(*b*) *As a Means of Assessing the Value of a Given Treatment.*—The electrencephalogram shows a most striking change within a short period after the termination of a treatment. Irregularities are usually much reduced. This, as estimated in terms of the D. I., can readily be seen from Table 1. The three patients whose indices are recorded there usually showed marked clinical improvement at such times, *i. e.*, immediately after insulin treatment. The D. I. values tend to rise again throughout the course of the day, and may return to their former level. Should the patient be progressing favorably, the pre-insulin index is progressively lowered by successive treatments. This will be shown in more detail later in Table 3. The three patients whose data are recorded in Table 1 were chronic cases and only one (R. W.) has been able to return home on visit. Of 35 pairs of factors taken before and after treatments, 30 showed post-treatment reduction; 23 typical pairs are shown in Table 1. This post-sugar reduction is not due to the type of occasional electrode failure previously reported.[1] The copious perspiring of the patients during treatment evidently facilitates satisfactory electrode contact. In the cases of all subsequent indices to be described in this paper only one record has been made for an electrode placement, the operation requiring only about five minutes, so that there can be no question of complications arising from the possible electrode failure earlier considered.

One of the greatest difficulties of the insulin treatment is that the type of treatment—whether deep or superficial coma, whether early interruption in the state of somnolence, or whether interruption during activation—has to be carefully adapted to the individual patient's condition and, moreover, must be varied as the patient's condition changes. The estimation of the D. I. before and after treatment seems likely to be of considerable assistance as a guide to the most desirable form of treatment.

(*c*) *Delta Indices of Normals and of Patients.*—Table 2 shows D. I.'s for different classes of subjects. Only one index is shown for each person.

From this table several things are apparent. In the first place we cannot say that a person with a high D. I. is schizophrenic

TABLE 1.

PRE-INSULIN AND POST-SUGAR DELTA INDICES.

Patient (T. G.). Delta indices (cm.).			Patient (H. H.). Delta indices (cm.).			Patient (R. W.). Delta indices (cm.).		
Date.	Pre-insulin.	Post-sugar.	Date.	Pre-insulin.	Post-sugar.	Date.	Pre-insulin.	Post-sugar.
Nov. 3.....	10.0	2.0	Nov. 6.....	25.2	2.4	Oct. 13.....	11.9	4.9
4.....	4.0	1.0	9.....	53.4*	8.6	14.....	3.6	4.4
6.....	7.0	2.5	13.....	6.4	6.0	15.....	4.3	0.2
9.....	2.5	1.0	20.....	51.2*	5.0	Nov. 3.....	2.8	3.2
17.....	4.1	1.2	27.....	27.2	0.2	4.....	3.1	1.2
18.....	6.1	0.6	Dec. 2.....	11.0	1.0	6.....	6.3	7.0
20.....	3.5	2.0				13.....	7.9	1.8
Dec. 9.....	2.6	1.5				16.....	2.0	0.3
						17.....	1.4	0.4

* Possibly augmented by a tie.

although it is true that our schizophrenics tend to average higher factors than others. Nor can we say that low indices mean that a person is not schizophrenic. A significant observation about the schizophrenics is that the patients who seem to be well adjusted to their psychoses, parole patients, long resident in the hospital who have made good institutional adjustments, and also certain catatonics who are quite unresponsive to the environment have, by and large, the lowest D. I.'s of the schizophrenic group. One

TABLE 2.

DELTA INDICES FOR DIFFERENT CLASSES OF SUBJECTS.

		Means.	Extremes.
37 normals	0.5, 0.5, 0.6, 0.7, 0.8, 0.8, 1.0, 1.0, 1.0, 1.0, 1.0, 1.0, 1.0, 1.3, 1.3, 1.4, 1.5, 1.5, 2.0, 2.1, 2.2, 2.3, 2.3, 2.4, 2.4, 2.4, 2.5, 2.6, 2.9, 3.0, 3.0, 3.0, 3.2, 5.0, 6.0, 11.0.	2.1	0.5–11.0
1 normal, awake and asleep.	0.5 awake, 10.9 asleep.		
12 alcoholics	0.5, 0.7, 0.9, 1.0, 1.3, 1.4, 2.0, 3.3, 4.0, 4.2, 5.0, 6.0.	2.5	0.5– 6.0
9 manic depressives	1.0, 1.2, 1.7, 2.2, 3.0, 3.0, 4.0, 4.2, 5.2.	2.8	1.0– 5.2
31 untreated schizophrenics.	0.5, 0.7, 1.0, 1.0, 1.3, 1.5, 1.5, 1.7, 2.0, 2.1, 2.1, 2.2, 2.8, 4.0, 4.0, 5.1, 5.1, 6.4, 6.4, 7.0, 7.2, 9.5, 10.0, 11.2, 11.3, 11.9, 12.0, 15.0, 17.0, 24.3, 25.2.	6.6	0.5–25.2

of the catatonics (H. H.) is an exception to this since he gives the highest indices we have encountered (*cf.* Table 1). This patient, however, is not a typical catatonic since he seems always in a state of anxiety and tension. He is considered catatonic since he refuses to speak or otherwise positively to respond to his environment except sometimes immediately after treatment. His high pre-insulin index may be due, in part, to an occasional tic, although the tic gives a characteristic wave form on the record and we have endeavored to eliminate it in measuring his D. I.

One of our patients (J. C.) occasionally, without warning, goes into a stuporous condition. The stupor is very pronounced with

eyes staring and with copious drooling. We have recorded indices from him on two occasions prior to stupor and again 10-15 minutes later during stupor. The electrencephalogram shows a striking change with the advent of stupor. Not only does the D. I. *decrease* but the alpha wave voltages *increase* from about 20 μv to 40-50 μv. Moreover, the percentage of the time that alpha waves are present also increases markedly in stupor. On one occasion the D. I. fell with stupor from 3.4 cm. to 1.5 cm. On another occasion the change was from 3.0 cm. to 0.5 cm. It should be noted that the index decreases despite increases in alpha potentials. This decrease in D. I. with changing symptoms is of interest in connection with the low D. I.'s usually found in the catatonic patients.

(*d*) *The D. I. as a Means of Estimating the Course of the Psychosis.*—From the data of Table 2 it might at first seem that the D. I. is of comparatively little diagnostic significance. However, if its limitations as an absolute measure are borne in mind, its *relative* change has been found to be very useful as a measure of the state of a *given individual patient's* psychosis from day to day. Since the index is usually greatly reduced after an insulin treatment (*cf.* Table 1) it is possible to know how low a particular patient's index may become, and it is reasonable to suppose that if the index can be forced down and held for a period of time that a parallel improvement in symptoms might be found to be correlated with the reduced value. That this is indeed the case is shown by our clinical data. It should be borne in mind that most psychotics coming to the psychiatrist for diagnosis are not "well adjusted" to their conditions. With new cases of this kind, extremely rare in state hospitals, the size of the factor may later prove to have diagnostic significance in comparing patients and normal persons.

The situation is somewhat analogous to heart-beat frequency (pulse) in man as a diagnostic index. Von Körösy, cited by Loeb,[4] found variations from 48 to 108 beats per minute in pulse frequencies in normal resting man. This does not, however, preclude relative changes in pulse rate for a given individual from being diagnostically valuable despite the fact that a 100 per cent rise in pulse rate for a man with a normal resting pulse of 50 would still be less than the unaccelerated pulse of a person with a resting value of 108 beats per minute.

Table 3 shows behavior of indices of patients on medication over periods of time and their correlation with independent qualitative clinical reports. In this table the D. I.'s were always taken some 15 hours after the previous insulin treatments. They are thus pre-insulin indices in the sense used in Table 1, *i. e.*, indices taken prior to a treatment that may be given the day of the recording. The indices have been obtained from each of some 13 patients approximately once a week. It will be seen that the weekly records follow quite well the clinical report on the patient's condition. To save space, clinical comments have been reduced to a minimum and 8 cases out of 13 have been selected for the table. It is unfortunate that the quantitative index must be compared to an entirely qualitative clinical statement but this is necessitated by the nature of schizophrenia. Comments such as better, worse, etc., are comparative with respect to the patient's condition at the time of previous date recorded in the table. Unless otherwise stated, patients were being treated five days per week.

In forming the clinical reports it was kept in mind that one of the major objectives was to investigate the possibilities of the D. I. as a practical clinical aid. Consequently the reports were based upon the series of data which the clinical psychiatrist utilizes in forming his judgment as to the progress of patients. Each patient was observed over several hours each day and, following on treatment, was interviewed. At the interview no searching analysis of the content of symptoms was made, as this in our experience has tended to produce relapse. The actual presence and, where possible, the intensity of the symptoms was checked, and in addition the patient's affective response, his capacity to mix with others, his work output, his care of his personal appearance, and his sex activity were all taken into account. In addition the psychiatrist's observations were checked against the daily reports from the nurses and against the periodic reports from the Occupational Therapy Department. The relatives were also interviewed at regular intervals, and their statements utilized to amplify the final judgment.

For all but one patient in the table there is good agreement between D. I. and clinical report. In this case (T. S.) there were no clinical criteria to compare with the factor, which seemed to

TABLE 3.

CORRELATION BETWEEN EXCESS FACTORS AND PROGRESS OF THE PSYCHOSIS.

PATIENT (A. S.) HEBEPHRENIC. TWO YEARS DURATION.

Date.	D. I. (cm.).	Clinical comment.
Nov. 27	15.0	From 27th at first steady improvement.
Dec. 3	12.0	Less excitement, better attending and social orientation.
11	5.5	
23	3.6	Steady improvement.
31	3.1	Steady improvement.
Jan. 6	2.2	Steady improvement.
15	3.1	Steady improvement.
21	12.3	Spontaneous relapse, worse.
29	3.0	Again improving.
Feb. 3	4.0	Better, and gaining weight.
10	12.0	Definitely worse.
19	9.0	Not doing well. Between 19th and 20th improved. Relapse on 22d.
23	9.1	About same as on 19th.

PATIENT (C. A.) INDETERMINATE. TWELVE YEARS DURATION.

Date.	D. I. (cm.).	Clinical comment.
Jan. 22	9.5	Slightly worse 22d to 27th.
28	12.0	Unchanged.
Feb. 4	12.0	Unchanged. More irritable and unpleasant than before treatments.
9	10.8	Unchanged.
19	6.8	Much improved.
24	2.0	Continued improvement
Mar. 1		Taken off treatment.

TABLE 3—CONTINUED.

PATIENT (E. B.) HEBEPHRENIC. FOUR YEARS DURATION.

Date.	D. I. (cm.).	Clinical comment.
Nov. 9	24.3	Considerable improvement to Dec. 10, then plateau in
13	10.9	symptoms, no further progress for some days.
28	4.2	
Dec. 3	4.1	
9	4.2	
19	2.2	Mild slump Dec. 10-21.
23	0.9	Better; home for Christmas.
31	2.6	Clinically worse.
Jan. 7	2.9	Slightly better.
9	4.8	Some relapse.
15	8.0	Some further relapse. On 22d, more irritable.
25	9.0	Not so well, relapse.
28	1.5	About same.
Feb. 1	7.0	About same.
3	2.0	About same.
8	3.1	Improved.

PATIENT (J. C.) CATATONIC. SIX MONTHS DURATION.

Date.	D. I. (cm.).	Clinical comment.
Dec. 15	5.1	By 22d much improved.
23	2.4	
Jan. 2	3.9	Influenza; treatments stopped 3d to 9th.
8	13.0	Much worse.
15	3.0	Better.
28	3.4	Slight relapse.
Feb. 3	3.0	Slight improvement.

TABLE 3—CONTINUED.

PATIENT (G. N.) EXCITED CATATONIC. SIX MONTHS DURATION.

Date.	D. I. (cm.).	Clinical comment.
Oct. 14	6.4	Steady improvement with relapse Dec. 9 to 12. Transfer
Nov. 24	6.2	to disturbed ward.
Dec. 9	3.1	
19	2.3	Told if behave, home for Christmas.
23	0.6	Further improvement.
31	2.7	Definite relapse.
Jan. 9	5.0	Jan. 4 and 5 suicidal, worse.
15	4.0	Very bad, *taken off* treatment.
18	4.0	Same.
21	4.7	Same.
25	2.0	Same.
28	4.0	A little better than 25th.
Feb. 1	4.0	Unchanged.
4	3.0	Unchanged.
9	4.2	Unchanged.
15	2.3	Family says he's improved but he is still off treatment.

PATIENT (T. S.) CATATONIC. ONE YEAR DURATION.

Date.	D. I. (cm.).	Clinical comment.
Oct. 14	5.1	No improvement at all with treatments.
Nov. 2	4.1	
4	4.1	He broods much, never speaks. D. I. varies considerably
6	17.1	but when low symptoms unchanged.
20	16.0	
28	6.2	
Dec. 3	4.2	
12	0.3	Though mute, does not appear to be completely out of
15	2.0	touch with surroundings but usually indifferent to
24	1.7	them.
31	2.8	
Jan. 7	2.0	
8	2.5	
16	18.6	
21	1.5	
28	1.0	

TABLE 3—CONTINUED.

PATIENT (A. C.) PARANOID. THREE MONTHS DURATION.

Date.	D. I. (cm.).	Clinical comment.
Jan. 15	11.2	Improves steadily until 25th, then some relapse followed by improvement to Feb. 9, then again a relapse between 9th and 23d.
22	5.5	
28	2.0	
Feb. 4	3.2	
9	3.3	
23	3.8	

PATIENT (T. G.) INDETERMINATE. MANY YEARS DURATION.

Date.	D. I. (cm.).	Clinical comment.
Nov. 2	17.0	Had been treated for some weeks prior to this.
3	10.0	
4	4.0	Cheerful and euphoric.
6	7.0	Improved.
9	2.5	Improved.
13	7.9	Some relapse, noisy and aggressive.
16	20.5	Definite slump, dull, uninterested.
17	4.1	Less dull, but less interested than when at his best.
18	6.1	
20	3.5	Quiet and subdued.
Dec. 9	2.6	Definitely better.
19	4.8	Taken off treatment.
31	4.8	Remains clinically about same until first week in February when has definite relapse followed by some spontaneous recovery. Lost 8 pounds between Jan. 15 and 25. By 19th 10 pounds underweight.
Jan. 8	4.9	
16	8.6	
21	5.5	
28	4.0	
Feb. 3	12.0	
9	3.5	
19	3.0	

fluctuate in a more or less random manner, often attaining surprisingly low values. In all, from the remaining 7 patients there have been obtained 84 D. I.'s. Of these 74, or 88 per cent, show good correspondence with clinical reports, *i. e.*, when a patient is recorded as better the index decreases, when worse, it increases. Indices for two of the patients show 100 per cent correspondence with clinical reports. Steady values occur when the patients sometimes show a plateau. Two patients not included in Table 4 have been difficult to follow clinically owing to considerable shyness and passivity. In one case (R. W., a catatonic) 18 out of 26, or 70 per cent, D. I.'s correspond fairly well with clinical reports. In another even more introverted and unresponsive patient (E. T.) the agreement holds in 9 out of 15, or 60 per cent, of the cases. Like T. S. in Table 4, none of these patients has shown the sharp behavioral contrasts manifested by the 7 other patients. Three other patients, making our total of 13, started with low indices (2-4 cm.) which remained low throughout the series of treatments. It was, therefore, not possible to use the D. I. as a measure with these patients. After a few weeks we ceased to record their D. I.'s.

The fact that 12 per cent of the indices for the 7 patients do not conform to the clinical picture, and that larger percentages for two others do not so conform, we believe may be due to three reasons. In the first place, qualitative estimations of a patient's gross behavior are subject to obvious limitations as criteria of degrees of psychosis. These limitations are especially pronounced with patient T. S. of Table 3, and with R. W., and E. T. not in the table. We believe we have eliminated our own subjective bias as much as possible by having one of us (R. or H.) obtain the electrencephalogram, seeing the patient only in the observation room during the test, and having another of us (C.) formulate entirely separately, without seeing the electrencephalogram, the clinical behavior report. Comparisons of D. I. and behavior report were made only about once a month. In one case, C. A., comparisons were made only at the termination of the series of treatments. A second source of discrepancy in Table 3 is the fact that changes in D. I. may actually precede changes in overt behavior of the patient. The third, and perhaps the most obvious, source of discrepancy between index and clinical report is the fact that there may be hour-to-hour spontaneous variations of several cm. in patients' D. I.'s, as

may be seen from the tables in our first paper.[1] The factor is fairly stable in most patients but in some the variations may produce a considerable error if only occasional progress records are used for samples.

(*e*) *As an Index of Changes Which Cannot Yet be Picked Up Clinically.*—We have some evidence that changes in the patient may be detected by the electrencephalogram before they are clinically apparent. It must be borne in mind, of course, that clinical improvement under insulin treatment may be either sudden, as after a particularly favorable treatment, or gradual, over a period of days. Similarly, a relapse may occur rapidly following upon, for example, a discussion of painful topics, or it may occur insidiously over several days. It is primarily to the gradual changes that we refer when we say that the electrencephalogram appears to give early warning of the occurrence of change. For example, in Table 3 it will be noted that the D. I. of E. B. remained at approximately 4.0 cm. from November 28 to December 9. The clinical report notes a plateau in symptoms only at the end of this period. Again, on February 3, E. B. was reported as about the same as he had been on January 25 with a D. I. of 9.0 cm. The D. I. of 2.0 cm. on February 3 appears to presage the improvement later reported on February 8, although the low value of 1.5 on January 28 had no prognostic significance. On January 29 and on February 3 the D. I.'s of A. S. were 3.4 and 4.0 cm. respectively. On February 10 the value was 12.0, the clinical report noting a relapse only at this time. It is possible that the setback began earlier, around February 3 when the factor increased to 4.0. From January 28 to February 9 C. A. was reported as "unchanged" although his D. I. on February 9 had decreased from 12.0 to 10.8, possibly a significant amount. Later there was progressive improvement, with his factor falling to 6.8 and then to 2.0. Here again it is possible that the initial fall from 12.0 to 10.8 heralded the improvement. The case of C. A. is especially interesting since all of his records were taken by Rubin and brought to the Clark laboratory to be analyzed by Hoagland who did not know the patient at all. Comparisons of his D. I. and clinical record, the latter kept as usual entirely by Cameron, were made only after completion of the series of treatments. Fig. 1 shows typical oscillograms of this patient for the series of dates recorded in Table 3.

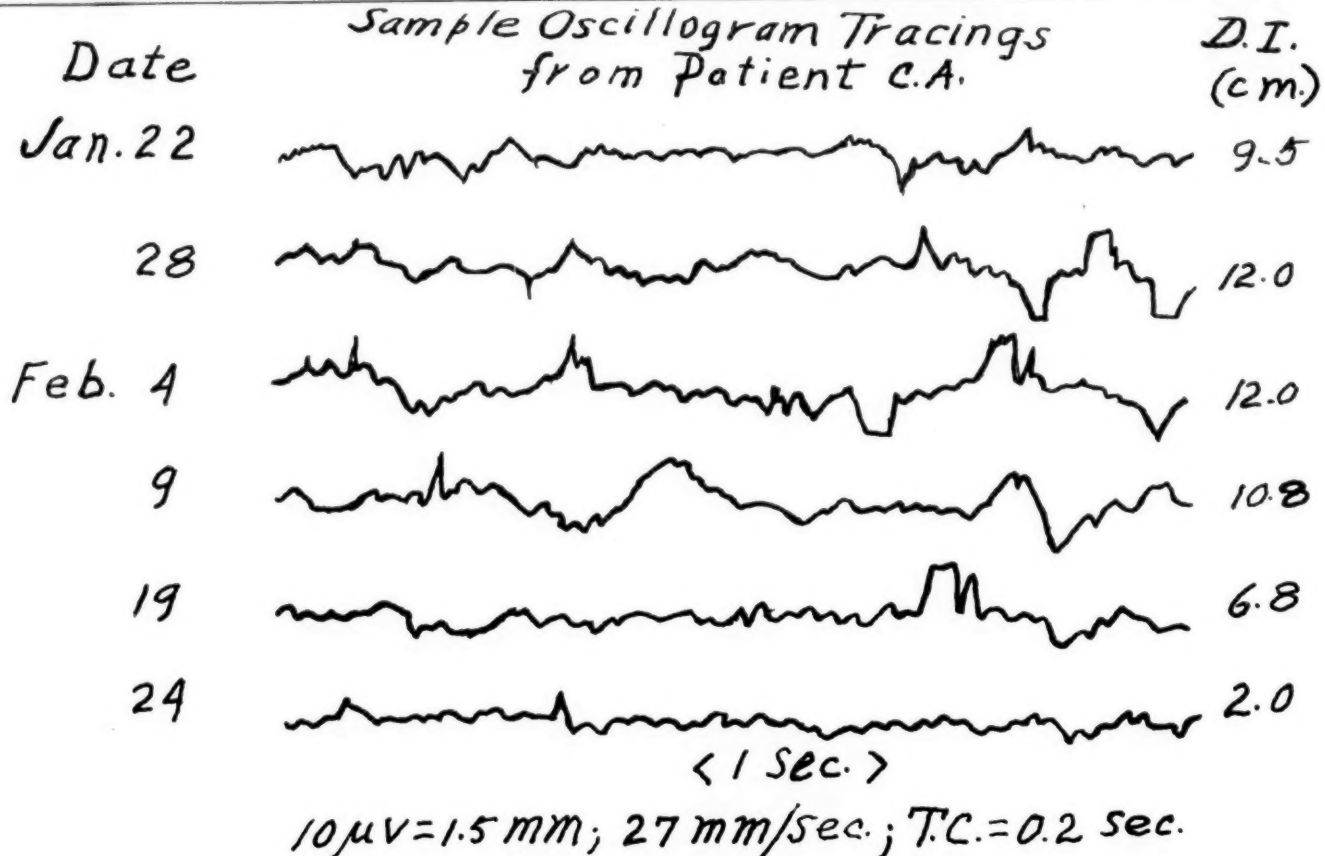


FIG. 1.—Sample oscillograms for the data of C. A. in Table 3 (see text).

Our most suggestive records in this regard were obtained from the patient J. M., not included in Table 4, which will now be given in some detail. This patient, who had been very ill for many months, was released from the hospital on October 19 in apparent full remission after evidently successful insulin therapy terminated on September 24, a date prior to the time we began recording brain waves. J. M. is an intelligent man who is helpful in discussing subjective aspects of his psychosis.

Our first record on October 14 yielded a D. I. of 0.3 cm. From time to time the patient returned to the hospital for examination. On December 1 we found his index to be 5.3 cm. but he reported himself as feeling well. Two days later fear that his thoughts might be read developed and he voluntarily returned to the hospital. His index then was 7.6 cm. He did not wish to remain for a new series of treatments but was, after some discussion, persuaded to do so. It is interesting that his index, after this decision and two hours after his return, had fallen to 4.0 cm. without a treatment, a decidedly significant drop, suggesting that the conversations and decision to remain and be treated may have had intrinsically some psychotherapeutic significance. His first treatment of the new series was given that same evening (December 8). The following table shows aspects of his case history in terms of his D. I.'s.

TABLE 4.

THE CASE OF J. M.

Second series of treatments daily, Dec. 8-21. The subsequent indices are "pre-insulin" D. I.'s. For discussion and case history of J. M., see text.

Date.	D. I. (cm.).	Date.	D. I. (cm.).	
Oct. 14.....	0.3	Dec. 12.....	1.5	
Dec. 1.....	5.3	14.....	0.8	
8.....	7.6	19.....	0.5	
2 hours later.....	4.0	23.....	0.6	(goes home for Christmas)
Dec. 9.....	0.8	31.....	1.9	returns once per week after this
10.....	0.1	Jan. 9.....	0.7	
11.....	0.1			

All symptoms, subjective or otherwise, were reported in abeyance from December 9 to January 18. On this latter date a time run, similar to those discussed in our first paper,[1] was made, the purpose being to study the hour-to-hour stability of his D. I. without treatment. Indices were obtained roughly every half hour during the day. Table 5 shows the results.

TABLE 5.

TIME RUN ON J. M. SHOWING TRANSIENT RELAPSE AT 10:17.

Time.	D. I. (cm.).	Time.	D. I. (cm.).
9:42	1.0	2:05	1.2
10:17	9.5	2:45	1.2
10:55	4.3	3:15	1.0
11:30	1.5	4:00	0.8
1:00	1.2		

The record at 10:17 was a great surprise to us. The patient had asked us about his record at 9:42 and we had told him of its integrated appearance. He also asked us about his second record and, in order not to alarm him, we evaded the question. After his third record he asked us again about the second record and we admitted it had appeared disintegrated. He then told us that prior to this record (D. I.=9.5), while waiting about the ward, he had intervened in a quarrel between two patients. Immediately afterward he said he had experienced a variety of compulsive ideas including one that he could never leave the hospital. It is interesting that his index had dropped to 4.3 at 10:55, about an hour after this transient relapse, the patient becoming more at ease and less tense. Fig. 2 shows typical oscillogram samples corresponding to the data of Table 5.

J. M. reported a good period when he returned for his next recording on February 1. However, his index at this time was 7.0 cm. We were careful not to tell him that his record looked disintegrated and he denied any subjective symptoms. Despite his high index we let him return home. The next day depressive symptoms with obsessive thinking to the effect that his thoughts could be read developed and lasted several days, but underwent spontaneous remission to a large extent before his next return for a recording on February 8. His index that morning looked rather

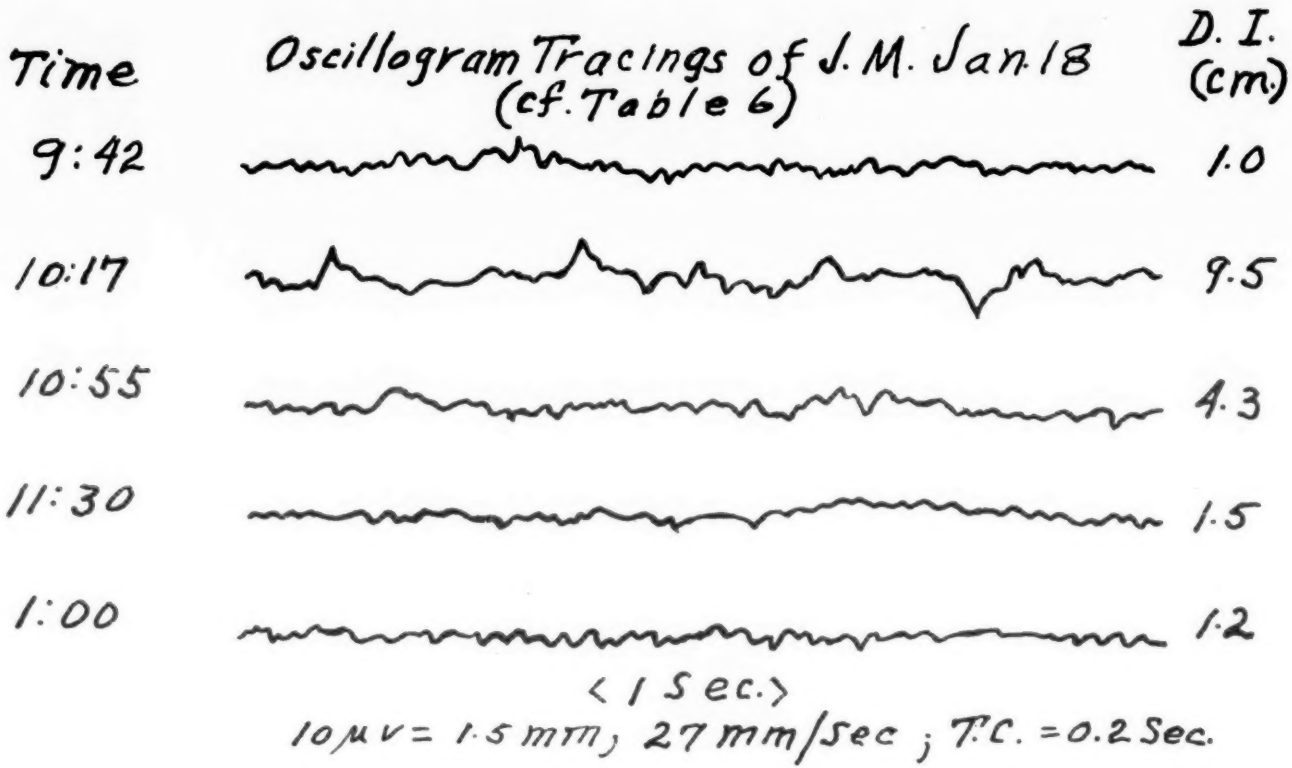


FIG. 2.—Sample oscillograms for J. M. showing increase in E. F. at 10:17 accompanying transient psychotic experiences.

high for him (it turned out on measurement to be 2.0 cm.) so we asked him to wait half an hour and have another recording. During this time he discussed with us (H. and R.) quite spontaneously his previous acute psychosis, we questioning him on certain of its subjective aspects. In the course of the conversation he asked us several questions concerning the biology of hermaphroditism and homosexuality. He seemed to have no personal interest in the subject but wanted information as a matter of curiosity. Neither of us knew at the time that during his acute early psychosis he had believed someone was trying to turn him into a woman.

At the time of our second recording on February 8 the patient seemed in every other way normal but his D. I. was 23.0 cm. So great was the change in the record that we removed and replaced the electrodes and recalibrated with extra care to make sure that the change was not a result of artefacts. After this recording J. M. said that on lying down his thinking became, as he termed it, "very mixed up." He said he did not think it had been brought on by the conversation since he often discussed his psychosis without being troubled, as he now clearly admitted himself to be. Nonetheless, it seems likely that some aspect of the conversation was inadvertently responsible, although he may still have been unstable (his earlier D. I. was 2.0 though normally <1.0) as a result of his spontaneous relapse earlier in the week. The patient wished to stay for more insulin treatments and was given one that evening. During the day the following indices were obtained prior to the treatment at roughly hourly intervals following his high factor of 23.0 cm.: 8.7, 8.1, 8.0, 10.0, 11.0, 10.4, 9.5 cm., and he reported continued compulsive depressive ideas. The next day after one treatment the value was 1.0 cm. and there was a remission of all subjective symptoms. A day or so later the patient went home, returning for a test on February 23. On this day his factor was 1.0 cm. and he reported himself as very well. In recent weeks J. M. has returned to the hospital once a week for an insulin treatment. Since February 23 we have only made one recording (March 1) and this yielded a pre-insulin index of 6.0 cm. Despite a subsequent treatment the patient says he experienced an acute depression with obsessive thinking 24 hours later on returning home.

FIG. 2.—Sample oschlograms for J. M. showing increase in E. P. at 16:17 accompanying transient psychotic experiences.

(*f*) *The D. I. as a Means of Control in Ambulant Cases.*—Recently we have initiated with patients J. M. and E. T., who have had prolonged hospital treatment but who have shown a tendency to relapse on returning home, a plan of ambulant insulin treatment. The patients are allowed to return to their homes and visit the hospital once a week or once every two weeks for a check-up and a treatment if necessary. In view of the fact that the observation of the relatives is naturally untrained, we have found that the delta index is of particular value. Should this ambulant method prove to be important, it seems probable that the D. I. may find considerably wider application. We feel that it has had especial value in the case of J. M.

Discussion.

On nine occasions we have noted changes in D. I.'s preceding corresponding *objective* changes in symptoms, *i. e.*, factors have increased preceding a relapse, decreased preceding a remission, or shown a plateau in advance of the clinical observations of a plateau in behavior. It is quite possible that changes in D. I. do not at any time precede subjective symptoms. We have been unable to answer this satisfactorily since most of our patients are noncommittal and uncooperative in describing subjective experiences, nor have we made any systematic efforts to tap their subjective lives in connection with D. I. measurements. Quite recently J. M. (whose "normal" D. I. is approximately 1.0 cm.) has admitted that on December 8, when we found his index to be 7.6 cm., that he was experiencing a strong subjective depression accompanied by compulsive ideas. These same disturbances were present but quite unsuspected by us at the time of his disintegrated records at 10:17, January 18 (D. I.=9.5) and again on February 8, second record (D. I.=23.0). On the other hand he assures us that he experienced no subjective symptoms on February 1 (D. I.=7.0) which preceded a relapse, on returning home, by 24 hours, nor on March 1 (D. I.=6 cm.) when the patient reported himself as well, but 24 hours later suffered a set-back after a treatment. Based purely on *objective* changes in symptoms, the index does, in an appreciable number of instances; four in Table 3, five with J. M., appear to precede the behavior change. In only two or three

instances have changes in indices occurred in a direction opposite to subsequent clinical developments (*cf.* Table 3). In these cases, however, subsequent indices were not taken until considerably later so that we are unable to say whether or not these changes may have presaged some temporary shift in the patients' conditions which escaped clinical notice. We feel that the fact that the D. I. has objectively indicated a relapse five times prior to behavior changes, including verbal admission, in the case of J. M., without ever misleading us by its fluctuations, is highly significant.

While clinical symptoms of mental patients are not quantitatively measurable, they nevertheless do fall on a rough qualitative scale so that we can designate the patient as worse, better, the same, etc., from one day to another. It occurred to one of us (H.) that the way of measuring the variability of the electrencephalogram outlined above might actually furnish an objective, quantitative description that would parallel the cruder clinical scale. The D. I. is indeed a measure of electrical variation in brain potentials as we have seen, the excess length in cm. being a function of the excess voltage produced by the brain over an arbitrary span of time for all waves longer than alpha waves. The content of the present paper indicates that the extension of this type of analysis to problems of psychiatry and neurology may prove of value.

A number of other problems related to the clinical application of the electrencephalogram to insulin treatment in schizophrenia have been considered. Among them was the question whether the D. I. would give any information of value in the selection of cases for insulin treatments. While it is too early to speak with certainty in this matter, it appears that the patients having a particularly high D. I. (15 to 20 cm.) do not respond as well as those having a D. I. within lower ranges. We have been particularly interested to ascertain whether the D. I. correlates with any particular aspect of mentation—inability to concentrate, tendency to projection, or formal disorders in the stream of thought, or whether the factors which produce the D. I. simply act as a substrate to behavior. While as yet we are not able to make a positive statement on this, it is to be recorded that there is no evidence of a correlation between the D. I. and the three aspects of behavior noted above. A useful lead may be furnished by the records on the patient J. C. in

whom the D. I. became about 1 cm. from a value of 3 or 4 cm. when the patient passed into a very deep stuporous phase. Clearly the state of being out of contact with the environment which occurs in stupor neurologically is different from that which occurs in sleep, since in the latter condition the D. I. rises markedly,[1, 2] while in stupor it falls.

We wish to reemphasize that we do not maintain that the D. I. by itself enables one to say whether or not a person is schizophrenic. Reasons for this are clear from Table 2. Both Berger[5] and Lemere[6] have described the electrencephalogram in schizophrenics and neither has reported a preponderance of long, slow waves. Jasper (personal communication) has assured us that he has not observed these waves in schizophrenics he has studied. There are several reasons why this is not surprising.

1. The waves are often qualitatively not conspicuous and, unless one is especially looking for them, they pass unnoticed. We would not have regarded the slow waves as significant had they not been so conspicuously modified by the insulin treatments. With rapid fluctuations in the psychosis, variations in the base line fluctuations from day to day were clear enough and called for a mode of measurement. Without a quantitative approach such as is furnished by the D. I., little can be said about comparisons of the occurrence of slow waves in normals and in patients since about half our schizophrenics give records with no more slow waves than we find in 90 per cent of our normal records. Only four out of thirty-one schizophrenics gave D. I.'s greater than 11 cm., the maximum for our normal group (*cf.* Table 2). The value of the D. I. so far has been in terms of its changes with a *given individual* patient.

2. It is possible that some selection of patients has been operative. This especially applies to our insulin patients since we have endeavored to select recently developed cases and avoid patients who are well reconciled to their institutional environment. We have observed that this latter class tend to have low D. I.'s. All of the patients recorded in Table 3 were selected because they started with high D. I.'s. Those with low initial D. I.'s are obviously unsuited to this type of analysis. Different institutions may also exert some selective action with respect to schizophrenic types.

3. Perhaps the main reason why our results may not be correlated immediately with the qualitative observations of others is because

of differences in amplifier characteristics used by different workers. In our earlier paper [1] we discussed in detail the effect of amplification, tape speed, line impedance, and time constant on D. I. All of these conditions play a highly significant rôle. We have used, for example, higher amplification than is usually regarded as convenient by most workers in studying the electrencephalogram in order to accentuate differences in D. I.'s. Unless our calibration conditions are precisely met by others, an unlikely state of affairs since our conditions have only just been published, we would not expect agreement. Moreover, unless measurements of D. I.'s under these conditions are *actually made,* it is futile to make comparisons since records giving, say, D. I.'s of approximately 8 cm. may fluctuate by ± 2 or 3 cm. and show no apparent difference in the predominance of long waves to the eye unpracticed in making these measurements.

To illustrate the importance of standardized conditions in D. I. determinations, it is worth mentioning that Dr. and Mrs. Hallowell Davis were at first unable to duplicate our results for reasons discussed in (1). They kindly brought their apparatus to Worcester and recorded *simultaneously* with us from the same patients. Three patients were selected for this study, one who gives a D. I. of about 2.0 cm., another of about 6.0 cm., and another of about 12.0 cm. After matching amplifiers and tape speeds, records were taken simultaneously by both recording systems from the *single* pair of electrodes attached to the patient.

Fig. 3 shows inked over oscillograms of typical synchronized records from the patients A, B, and C. The number 1 sample of each pair of records was taken with our apparatus, the number 2 with that of the Davises. Lines are drawn through each record to show the course of the map measurer in determining the D. I. The D. I.'s for both instruments on synchronized meter records agreed in most instances to within 1 cm. We do not wish to imply by this that the Davises have confirmed our findings relating D. I.'s and schizophrenia. Confirmatory experiments of this type have not been attempted. The comparison does, however, show that another amplifier can be matched to ours and that D. I.'s so determined are in agreement with those obtained with our apparatus.

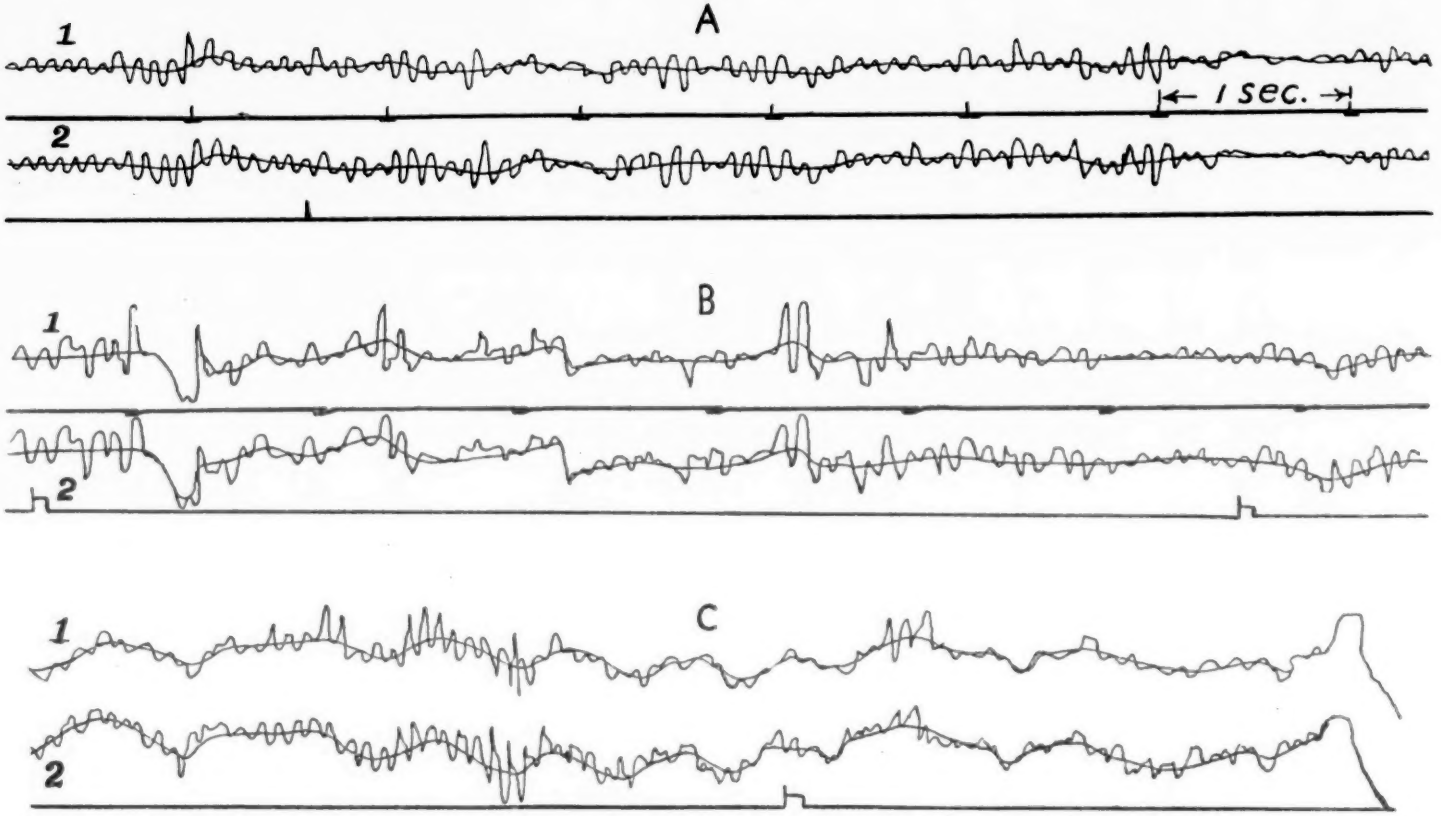


FIG. 3.—Sample oscillograms taken *simultaneously* with two entirely independent ink writers operated through different amplifiers after amplifier calibrations had been matched. *A*, *B*, and *C* are different patients; the numbers 1 and 2 refer to the different recording systems. Typical lines followed by the map measurer in determining the D. I.'s are drawn through the oscillograms.

Summary.

1. In 30 out of 35 insulin experiments the post-sugar delta index is considerably less than the pre-insulin delta index. In about this same proportion of cases patients show clinical improvement after treatments.

2. Mean delta indices for 37 normals are 2.1 cm., extremes 0.5-11.0 cm. Thirty-four of these were 3.2 cm. or less, the three higher values were 5.0, 6.0, and 11.0 cm. One normal awake gave a value of 0.5 cm.; asleep 10.9 cm. Twelve chronic alcoholics gave a mean of 2.5, extremes 0.5-6.0 cm. Nine manic depressives gave a mean at 2.8, extremes 1.0 to 5.2. Thirty-one untreated schizophrenics gave a mean of 6.6 cm., extremes 0.5 to 25.2. Twelve of these values were greater than the schizophrenic mean of 6.6 cm. Despite the mean differences the delta index cannot be regarded by itself as a measure of the schizophrenic state owing to overlaps in values between the groups of normals and patients.

3. Eighty-four delta indices taken on seven patients showing high pre-treatment indices, each over some weeks of treatment, exhibit in 88 per cent of the case complete correspondence with independently determined, fluctuating, objective clinical symptoms. With two other patients indices corresponded to symptoms in 60 per cent and 70 per cent of the instances. These two patients were verbally unresponsive and showed little detectable day-to-day change in symptoms to correlate with the indices. Patients who have "low" pre-treatment delta indices, *i. e.*, 4 cm. or less, about 50 per cent of a group of 31, cannot, of course, be analyzed by this method.

4. In schizophrenic patients we have found no special brain waves qualitatively different from those found in normal persons.

5. Transient relapses and remissions of one patient, earlier released after apparently successful insulin therapy, correlated completely with very specific fluctuations in his delta index.

6. In nine instances, with several patients, delta indices have been found to change prior to any other objective change in symptoms. Five of these nine prognostic changes were recorded with one individual.

FIG. 3.—Sample oscillograms taken *simultaneously* with two entirely independent ink writers operated through different amplifier calibrations had been matched. *A*, *B*, and *C* are different patients; the numbers 1 and 2 refer to the different recording systems. Typical lines followed by the map measurer in determining the D. I.'s are drawn through the oscillograms.

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Comment.

WAR PROPHYLAXIS.

In an editorial comment in the JOURNAL for November, 1935, there was reproduced a formal statement drawn up by the Committee on War Prophylaxis constituted by the Netherlands Medical Association. This document, calculated to combat the dangers of the war psychosis and signed by psychiatrists from 30 nations, was transmitted to the statesmen of the world.

In a letter from the Netherlands Medical Association through D. J. Roveda its Honorary Secretary, dated at Haarlem in January 1937, progress in the campaign against war is reported, together with all the replies received from the statesmen of the various nations to whom the letter of 1935 was addressed, also press comments from 13 countries.

Upon the replies from the statesmen the committee comments: "We regret that those replies are not very important but we had not expected anything else." The replies vary from bald acknowledgment in two or three lines (example: "The Lord Chancellor acknowledges with thanks the receipt of the letter addressed to the Statesmen dated October 1935"), to elaborately polite agreement with the views expressed. From Washington comes the assurance that "The Department of State has been glad to give appropriate attention to the opinions expressed and appreciates your courtesy in transmitting this document."

There were exceptions however. From the Mongolian People's Republic came the following:

> We are in entire agreement with you that the reciprocal involvement of international interests and the influence of an international organization will enable the statesmen of the world to institute an effective campaign against war, and that peace will become much more secure than hitherto so soon as effort and money are devoted to the maintenance of peace commensurate with present outlay for armaments.
>
> We welcome therefore the initiative you have taken and declare our unqualified readiness to join in the movement toward a united front of all opponents of war—a movement which is certainly gaining impetus among the peoples of various lands. We are persuaded that a genuine collaboration

of peoples, even through the agency of presently existing international organizations, represents a potentially powerful factor in the peace of nations.

We harbor hatred for no people; we have no hatred for the Japanese people; and we firmly believe that the vast majority in every nation—even in Japan—is averse to war. It is necessary to make these majorities see clearly the danger of new wars and to organize their efforts for the maintenance of peace.

The words of the statement from which the foregoing paragraphs are extracted do not sound like the vacuous verbiage of customary diplomatic communications. This unique message is further noteworthy in the fact that it was signed by eight ministers of government and 171 leading intellectuals of the Mongolian Republic. For once it would seem that government and people are speaking the same language. Verily wisdom and good counsel came out of the East.

Official replies were received from 19 nations. France, Germany, Italy, Japan, Soviet Russia and Spain were not heard from.

The press of the world has taken encouraging note of the appeal of the Netherlands Medical Association, and for the most part echoed its challenge. The *Boston Evening Transcript*, under the caption "War Psychology, Analyzed, Becomes Form of Madness," says:

That whole peoples can be carried away, by the hypnotic power of propaganda until they are led into actions abhorrent under ordinary circumstances, is the chief warning contained in a remarkable document recently sent by the Committee on War Prophylaxis of the Netherlands Medical Association to the statesmen of the world. It was signed by 350 psychiatrists of 39 nations, and it presents for the first time a complete analysis of the whole field of war psychology.

But statesmen are only human beings, and heads of states are likely to partake least of those qualities which by a conspiracy of tradition and convention we agree to call "divine." All are subject to the same disorders of digestion, the same aging processes, the same circulatory disturbances as other men. The statesman, in the very nature of the case, seems bound to play a duplex rôle. His desire for power and domination must be discreetly clothed in the garment of public service. This makes it possible for him to protest that his personal critics are "enemies of the people." Rather more than in ordinary human affairs his acts are prone to follow upon motives which are unrecognized or at least unacknowledged, and which only succeed because they are hidden.

The *Boston Transcript* continues:

Statesmen are not always sane and responsible, mentally balanced individuals. They may be suffering from hidden fears, hates or unconscious urges to obtain power. Personal fears may be translated into public concern over the safety of the nation or real or imagined threats from neighbor nations. The personal urge for power, as a desire to spread culture to unenlightened groups and to carry the flag to the outermost reaches of the earth.

The *Baltimore Sun*, commenting upon the manifesto of the psychiatrists through the Netherlands Medical Association, says:

If the doctors seem innocently to have neglected fundamental aspects of the problem that agitates them—the economic roots of nationalism and war, and the political flowering of these roots—they have at least done a service, first in making plain that both the war and the preparation for war constitute, in a strict sense rather than mataphorical, a very real disease, and second, in recalling to the leaders that even in high places a pathological contradiction between pretensions and intentions can be seen for what it is.

From the *Berkeley Daily Gazette* we read:

Some great nations are today led by men known to be mentally unbalanced. This is the charge made by Dr. H. J. Norman, president of the psychiatry section, Royal Society of Medicine . . . . . Said Dr. Norman: "When we look about in the world we can still appreciate how applicable is the saying of the great Dr. Johnson when he pointed out 'As a madman is apt to think of himself as grown suddenly great, so he that grows suddenly great is apt to borrow a little from the madman.'"

There are at the present time individuals holding prominent positions and influencing the destinies of whole countries who are known to be mentally unstable or who have actually had attacks of mental disorder, declared Dr. Norman.

It is not unreasonable to hope that safeguards may somehow be set up so that such conditions will not recur in the future.

From the Province of Quebec we find in *Le Canada* the following paragraph:

Il semble que les psychiatres soient aussi impuissants que les politiques, lorsqu'il s'agit de définir des moyens pratiques de prévenir la guerre ou de la mettre, comme disent les Anglais, hors la loi. Leur intervention n'est pourtant pas inutile. On retiendra surtout le fait que les peuples n'ont pas la moindre idée de la chose épouvantable que serait une nouvelle guerre avec les engins de destruction que les puissances possèdent maintenant. Il faut les éclairer. C'est une œuvre à laquelle se devraient dévouer tous ceux qui sont en position de se faire entendre.

One of the most forthright declarations on the war psychosis and a vehement denunciation of war traffickers, pathological or

criminal, was uttered by the Karlsbad *Volkswille* under the caption: "Warning of the Psychiatrists." the *Volkswille* said:

Dass diese Welt vom Wahnsinn missregiert wird, dürfte für jeden Einsichtigen ausser allem Zweifel stehen. Neben den Unzurechnugsfähigen sind es die kalt spekulierenden Verbrecher, die das Elend dieser Erde auf dem Gewissen haben.

So ist es nur natürlich und konsequent, dass sich jetzt die Irrenärzte in aller Welt zusammengetan und einen Protest gegen das Chaos beschlossen haben, das diese Erde verwüstet. Die Irrenärzte sind gewiss competent, die pathologische Beschaffenheit unseres Zustandes zu analysieren, der übrigens fast unheilbar scheint. Aber die Psychiater haben noch einen anderen Grund, ihre gewichtige Stimme gegen den kommenden Weltkrieg zu erheben.

Sie wissen nur zu gut, was es mit der verlogenen Phrase vom reinigenden Stahlbad auf sich hat, sie wissen, welche Verwüstungen ein Krieg anrichtet, wie sich Geisteskrankheit und Verbrechen der Vernichtungsbahn der Tanks und Flammenwerfer anschliessen und wie sehr, neben der physischen Verwüstung, die seelische Dezimierung der Menschheit ihre grausige Orgien feiert.

Die Irrenärzte der Welt haben gesprochen. Mögen die Gesunden, die Mord, Vernichtung und Wahnsinn bedrohen, auf ihre warnende Stimme hören und den Geisteskranken die die Welt verpesten, ihr gemein gefährliches Handwerk legen, ehe es für all, für die Gesunden und für die Kranken, zu spät ist.

From Switzerland we read the following in the monthly psychological journal *Psyche*, published in Bern:

Es geschieht unseres Wissens zum ersten Male, dass jene Wissenschaft die wie keine andere dazu verpflichtet ist, asoziale und ahumane Kollektivwahngebilde zu zerstören und auf ihre primitive Wurzeln zurückzuführen, nähmlich die Psychiatrie, aus ihrem theoretischen Wissen als Seelenheilkunde auch die practisch-therapeutischen Konsequenzen zieht und eine wissenschaftlich begründete Auferklärung übernimmt, indem sie sich öffentlich und direkt an die Betroffenen wendet selbst wenn as Staatsmänner sind. Wir möchten wünschen, dass diese Art der angewandten Psychologie nicht ein einmaliges Ereignis sei.

Die Kundegebung der Psychiater ist wohl als Manifest wie auch als wissenschaftlicher Kundgebung von grösster Bedeutung. Wenn diese Botschaft der Seelenheilkunde an die Staatsmänner bei letzteren wirklich die Würdigung findet, die sie verdient, wäre von morgen an die seelische und wirtschaftliche Entlastung unmittelbar in der ganzen Welt zu verspüren. Das seelische Aufatmen, das durch ganz Europa gehen würde, wen dieser erstaundliche Einbruch der Wissenschaft in die Diplomatie therapeutische Wirkung hätte, würde bis in die Konsultationszimmer der Nervenärzte gehört—vielleicht besonders dort. Und so stellt sich kritischpsychologisch zum Schluss zwangsläufig nur noch die heikle Frage: was denn eigentlich von den Staatsmännern psychiatrisch zu halten sei, wenn diese klare Manifestation der Nervenärzte und Psychiater ohne therapeutische Wirkung verhalle?

The foregoing are samplings from the world press. Similar voices were raised in Latin America and in certain other European countries. As with the replies from the statesmen the response of the press was not universal. For the most part, however, this response contrasted with the sayings of the statesmen in its honesty of purpose and in the evident genuineness of desire, even though hardly hopeful, for international collaboration for the peace of the world.

The peoples of the nations desire peace. The intellectuals, the scientists, those with faith in the possibility of human progress and whose objective is the pursuit of culture desire peace. But the levels of mankind are determined by the hierarchy of the mind, and among leaders as among commoner men are inevitably those whose motivations are primitive motivations and who recognize no argument but that of force.

The voice of the psychiatrists of the world has at least been heard. In the broadcast of their unanimous declaration the Netherlands Medical Association has produced a historic document the influence of which may some day be more effective than in the present distraught state of world affairs. The Netherlands Medical Association has taken a forward step such as had not been done before. Encouraged by the results so far attained it is to be hoped that this distinguished body will continue energetically their campaign against the psychosis of war and of the makers of war.

PSYCHIATRY AT THE FIRST INTERNATIONAL CONFERENCE ON FEVER THERAPY.

(Condensed from a Report Prepared by Dr. Maurice Ducosté, of Villejuif, France.)

A meeting of unusual significance was the First International Conference on Fever Therapy, which was held in New York City, March 29-31, 1937.

Dr. Allen O. Whipple of Columbia University welcomed the congress, which included an organizing committee of scientists of 24 nations, delegates from the ministers of health of 16 nations, and Secretaries Drs. William Biernan and Andre Halphen.

French scientists gave the introductory reports on each question. In the opening speech Prof. Pierre Abrami of Paris discussed therapy fever in general, particularly from a biologic and therapeutic point of view. He first analyzed the two processes followed to provoke artificial fever; the intravenous injection of a foreign substance, usually protein; and the utilization of physical means, such as short waves or a warm, humidified atmosphere. In the first, "shock" is obtained: it escapes for the most part medical control; the reactions can be very brutal; it is not prudent to employ this method with exhausted or infected individuals; fatality is always a possibility to be considered, irrespective of the method. Fever, obtained by physical means, has none of the inconveniences; it brings no shock; the doctor can control it; he regulates at will its intensity and duration.

Since these two methods give similar therapeutic results, they must act by a common factor, probably not hyperthermia *per se*, as one might at first suppose. Certain shocks cure without elevation of temperature and already many physicians speak of pyretotherapy without fever. Thus, in malariatherapy some general paralytics have recovered without febril attacks, and Dr. Ducosté draws attention to frequent cases in which paludism inoculated into the cerebral substance of paralytics evolves without any rise in temperature, although the patients derive the usual therapeutic benefits from it.

In the second place, a patient may have a very high temperature for a long period without deriving any benefit from it, in typhoid and undulant fever, for example. If a shock-producing substance is injected into this patient, this shock may cure him in a few hours without the fever curve showing even a few tenths of a degree rise.

Finally, if hyperthermia were the sole agent, the two methods should give the same results. However, this is most often not the case: in acute gonococcic arthritis shock pyretherapy very frequently effects a cure in a single session, while pyretotherapy, by means of physical agents, does not cure these same lesions at equal temperatures except after many sessions.

Besides, if hyperthermia were the truly therapeutic element of pyretotherapy, shock pyretotherapy would have to be rejected in

favor of physical pyretotherapy, because of its uncertainties and frequent contra-indications as well as its actual dangers.

The author believes that what causes the cure of an illness, with one method or the other, is the sum of very complex biological reactions which are associated with artificially induced fever and especially the important modifications which take place in the functional state of the neurovegetative system. With protein therapy, these reactions are always much more violent and that is probably why this method often gives results which seem almost miraculous. On the other hand, the biological reactions (following injection of foreign protein) which are almost always associated with a febrile attack, can sometimes exist without hyperthermia and produce even in these cases the anticipated therapeutic results.

Prof. A. d'Arsonval referred to his work in 1882: "I am persuaded that the therapeutic of the future will employ as a curative means the physical modifiers, heat, light, electricity and other agents still unknown, and that the most poisonous drugs of chemistry will have to give place to these imponderables that have the advantage of introducing no poison into the organism."

Dr. Maurice Ducosté of Villejuif (France), delegated by the Prefect of the Seine, stated that artificial fever has cured many formerly condemned patients and saved the city of Paris much money, which has been used to improve Asylums of the Parisian region. Moreover, this success encourages hopes for a cure for dementia præcox in the near future.

Prof. A. Bessemans of Ghent (Belgium) considered the action of fever in experimental syphilis of the rabbit. The treponemes rapidly lose their mobility and virulence at a temperature of 40-42° C. A strict control of focal temperature is necessary, and can be obtained only with thermometers in quatrz, or glass thermometers filled with benzine or mineral oil.

Prof. Bessemans observed further a thermal adaptation of the treponeme comparable to that which he attributed to the pale treponeme *in vivo* of the lymph glands of the syphilized rabbit and to other functional varieties of the same parasite.

He concludes: the experimental and clinical results agree in suggesting for antisyphilitic thermotherapy repeated hyperpyretic treatments which combine physical methods and chemical spiro-

cheticides. Notably in the repetition of the treatment an important rôle is played by the mobilization of the lymphocytic forces in reserve.

Dr. L. Mary Moench of Cornell University presented a study of the heat sensitivity of the meningococci *in vitro* in therapeutic temperatures. The resistance of the cultures in medium semi-solid veal infusion agar is variable, but the fact that some are destroyed in 5 hours of heating or even less shows that the fever therapy could be advantageously employed in treating meningococci rebellious to serotherapy.

The reports of Prof. Ch. Richet, Jr., of Paris, "Posology of Therapeutic Fever," and of Profs. Leon Binet and Charles Gernez, also of Paris, "Physiology of Fever," aroused much discussion.

Dr. Charles Austin Doan of Columbus (Ohio) contributed a study of the differential reaction of bone marrow, connective tissue and lymph nodes to hyperpyrexia, which sheds light on the little-known action of fever in general paralysis.

Dr. James D. Hardy of New York City revealed his researches on the mechanism of heat loss in the human body, using Russell Sage's calorimeter. In natural fever, heat losses are due to radiation, convection and vaporization. It has been found that the mechanism for heat loss is adequate to care for twelve times the basal heat production. The spontaneous fever is due almost entirely to malfunction of the mechanism for heat loss, in fever produced by chills or without a chill.

Dr. Stafford L. Warren of Rochester, N. Y., insisted on the necessity of careful administration of chlorides and liquids in prolonged fevers, thus avoiding many of the sequellæ, such as nausea, vomiting, prostration, following hyperpyrexia.

Drs. Michael Pijoan, Israel Kopp and John Gibson of Boston (Mass.) spoke of the acid base balance during therapeutic fever. They conclude from their chemical analysis of the blood in the course of the fever that the therapeutic fever, characterized by severe dehydration and hyperventilation, brings about a pronounced alkalosis. The degree of alkalosis which approaches critical levels depends primarily upon the severity of the dehydrating and secondarily upon the extent of the hyperventilation.

They also report the changes which occur in blood chemistry; and Drs. Gibson, Kopp, and W. A. Evans, Jr., the changes in blood volumes during therapeutic fever. This last study was made on general paralytics, using the authors' blood volume method.

Comparative data are given on the per cent of reduction of plasma volume from pre-febrile levels occurring during fever induction by the use of typhoid vaccine, malarial organism, diathermy, the Kettering Hypertherm, and by means of radiant energy in cabinets with limited air space. No important change in volume occurs during fever induction by the two first mentioned methods. With diathermy, no considerable reduction in volume takes place until high temperatures have been reached. With the hypertherm, the reduction is extreme and occurs early in the course of fever induction with the result that a severe degree of tissue dehydration takes place by the time therapeutically desired temperatures have been obtained.

In the authors' opinion, the degree of dehydration and danger of serious circulatory disturbance is considerable during fever induced by the hypertherm, even when fluids are liberally given by mouth.

The preceding communications can be compared with those of Drs. Andrew Dowdy and Frank W. Hartman of Detroit (Michigan), on the preparation of patients for fever therapy with special reference to the administration of fluids and sedatives. They have found a carbamide sedative more satisfactory for the basic sedation than the barbituric acid group of drugs. Sedation is started the night before the treatment and completed the following morning approximately one hour before the fever therapy is started. The patient is given a high carbohydrate meal the evening prior to treatment, 500 cubic centimeters of 10 per cent glucose in physiological saline is given intravenously at 6.30 a. m. the morning of treatment. Breakfast consists of toast and tea at 7 a. m. During the pyretotherapy, the patient is given an iced solution consisting of six-tenths per cent saline, and 3 per cent glucose to take by mouth.

Dr. F. W. Hartman presented a study illustrated with microscopic photographs of pathological changes produced by artificial therapy in animals and man.

The exhibition of apparatuses included " Short Waves, a Perfect Pyretogenic Agent " by Dr. Andre Halphen and Dr. Jacques Auclair of Paris. They consider after treatment of 3000 patients for diverse diesase that short waves are the most powerful and easily controlled thermogenic agent. They praise the suppleness of the treatment, its simplicity, safety and comfort.

Prof. Clarence A. Neymann (Chicago) displayed a new machine for producing artificial fever.

Dr. Martha Brünner-Ornstein of Vienna discussed the development of physically produced fever therapy at the neuropsychiatric clinic in Vienna. She sees much promise in the combination of electrical pyrexia with chemotherapy.

Dr. W. Herr Russell of London employs two methods at the Temperance Hospital, London: a condenser field produced by ultra short waves (12 meters) and short wave electromagnetic induction (25 meters). He considers electropyrexia essentially a hospital treatment with specially trained doctors and nurses in constant attendance.

The sulphur fever therapy of Dr. Knud Schroeder of Copenhagen was presented by Dr. Tage Christiansen. He has used sulphurated oil (sulfosin) in combination with chemotherapy not only in the fever treatment of general paralysis of the insane and other syphilitic and non-syphilitic affections of the central nervous system, but also in schizophrenia and other forms of mental diseases, and in cases of chronic encephalitis. The many virtues of this method were elaborated and exact directions for its use were given.

Prof. G. Pamboukis of Athens observed during a dengue fever epidemic at Athens in 1908 that this fever and its toxins seem to have a special therapeutic effect. It is unfortunately impossible to control the illness on this side of the danger limits.

Prof. Antoine Alajouanine and Dr. G. Mauric of Paris reviewed the results obtained in France by pyretotherapy in neurology. The results are best in syphilitic diseases of the nervous system, while they are debatable in non-syphilitic affections, but further research is necessary.

A very large number of communications dealt with fever therapy in neurology, and various motion pictures were presented.

Prof. J. Wagner von Jauregg summarized his researches and stated:

> It was found that it makes no difference that the theoretical foundation of a therapeutic *method* is wrong, providing the therapeutic *success* is secured. We have learned that the spirochetes are present in the human organism for different periods of times and are still capable of living—even after a successful treatment. This holds true also for the gonococci. However, therapeutic results are obtained. Therapy is always empirical, therefore, we have to change the theory, and keep up the method of treatment.

Prof. Henry Claude and Dr. Pierre Rubenovitch of Paris had charge of "Fever Therapy in Psychiatry." They apply three methods: malaria inoculation, sulphur therapy and electropyrexia, with or without chemotherapy and opotherapy. They have employed these methods in general paralysis, manic-depressive psychoses and other psychopathies, confusional and schizophrenic syndromes. They believe that the effective factor in pyretotherapy from the theoretical point of view is the elevation of temperature and accompanying shock phenomena. In practice they prefer in the treatment of general paralysis the malaria inoculation followed by prolonged chemotherapy. However, they reinforce the effect of post-malarial chemotherapy by electric fever.

In confusional states, schizophrenia or dementia præcox, sulphur and colloidal gold therapy is applied to those in which a latent bacillary infection is suspected, while electropyrexia associated with opotherapy is applied to the others.

They insist upon the necessity for early treatment. This gave rise to a discussion, in which the value of pyretotherapy in the treatment of dementia præcox was seriously questioned, while insulin-therapy was esteemed to be perhaps of some potential value.

It was noted that fever exaggerated the individual's outstanding personality characteristics, and tended to induce delirious episodes in the unstable.

General paralysis, triumph of therapy, was the subject of many important communications. Drs. Leland E. Hinsie and Joseph R. Blalock of New York City analyzed the serologic results of a 12-year practice, numbering 326 general paralytics. Their results:

> 1. Ten years after treatment, 75 per cent of 28 patients had a negative blood Wassermann reaction; 89.3 per cent of 28 patients had a negative

spinal fluid Wassermann reaction; 100 per cent of 26 patients had a normal cell count in the spinal fluid; 75 per cent of 24 patients had a negative globulin reaction; and 73.1 per cent of 26 patients had negative gold sol curves.

2. Those patients who gained a clinical remission showed a higher percentage of negative serological reactions than the patients in other clinical categories. We do not believe that serological information may be unqualifiedly used in the prognosis of individual patients; it is valuable principally for comparing results in groups of patients. In our own experience, perhaps the safest time, if there is any, to estimate the future course of the patient's condition, from the standpoint of serology, is three or four years after treatment has been started.

3. With our group of 326 patients, the most favorable clinical and serological results were observed in those patients who received fevertherapy, followed by chemotherapy.

A number of other interesting papers could not be read, but will appear in the Reports.

The pyretotherapy of syphilis was studied by several authors. Drs. Walter M. Simpson and H. Worley Kendell of Dayton (Ohio) felt that although artificial fever shortens the treatment and increases its efficacy, vigorous, long-term inquiry in large clinics with suitably trained personnel is necessary before adequate treatment on a mass scale can be found.

Dr. Frank R. Menagh of Detroit, in his 3½ years experience in the treatment of syphilis by hyperpyrexia, obtained good results in general paresis and taboparesis (45 cases) and in tabes dorsalis (27 cases), but pain did not abate as much as he had hoped.

He concluded that artificial fever therapy is an important addition to the armamentarium of therapeutic agencies against syphilis, particularly in the more serious forms of the disease, which do not respond to chemotherapy alone.

There were no cases in this series where malarial fever produced satisfactory results when physically induced fever had failed. On the other hand, artificial fever showed a superiority only when a satisfactory degree of fever could not be obtained with malaria.

Dr. Clarence A. Neymann discussed the treatment of syphilis with artificial fever. Electropyrexia, according to careful statistics he presented, has increased the total rate of improvement 21 per cent and has virtually eliminated the 10-30 per cent death rate attributed to malarial therapy. A combined treatment with artificial

fever and arsenicals is highly recommended for general paresis, tabes and early syphilis. It is, however, too time-consuming and expensive for large-scale application.

Summing up, the First International Conference on Fever Therapy has brought to psychiatry very important general indications on the physiology of artificial fever, on the process and apparatuses that can provoke it, on the conducting of the treatments, and the therapeusis of the observable incidents. The results obtained from syphilographs were also shown to be important, and the advantages of fever therapy in general paralysis, tabes dorsalis and nervous diseases were demonstrated.

Most of the scientists urged the necessity of adjoining chemotherapy to artificial fever. Almost all agreed on the inutility of diverse pyretotherapic methods in the treatment of mental diseases, especially in dementia præcox.

K. M. B.

News and Notes.

MEETING OF THE AMERICAN PSYCHIATRIC ASSOCIATION.—The 93d annual meeting of The American Psychiatric Association was held at the William Penn Hotel, Pittsburgh, Pa., May 10 to 14, 1937.

On Monday, there were meetings of the sections on convulsive disorders and forensic psychiatry. The meetings of the section on convulsive disorders, including an informal evening round table dinner with 102 present, were joint sessions with the American Chapter of the International League Against Epilepsy.

The general session opened Tuesday morning, it being called to order by the president, Dr. C. Macfie Campbell. Following an invocation by the Reverend Bernard C. Clausen, there were addresses of welcome by Dr. Sidney A. Chalfant, president of the Allegheny County Medical Society and Dr. James K. Everhart, president of the Academy of Medicine of Pittsburgh, with a response by Dr. Ross McC. Chapman, president-elect.

The Association paid tribute to the memory of 33 deceased members, a special memorial to the late distinguished president, Dr. William A. White, being read by president-elect Chapman.

The presidential address read by Dr. Campbell evoked continued applause, the audience rising in appreciation. The address is printed in this number of the JOURNAL.

Three section meetings on Tuesday afternoon, included a symposium on child psychiatry; studies on habitation; and studies from the laboratory.

On Wednesday, there was a joint session with the section on psychoanalysis and The American Psychoanalytic Association; also sessions on brain pathology, clinical studies and therapy.

On Wednesday evening the annual dinner occurred at which there were 529 present. The address was given by John Gabbert Bowman, A. M., LL. D., L. H. D., Chancellor, University of Pittsburgh, on the subject "The Health We Need," his presentation being received with many favorable comments.

Following entertainment furnished by National Broadcasting Company artists, there was dancing with music by the Strollers Orchestra.

On Thursday, there were joint sessions with The American Psychopathological Association and the section on mental deficiency; also sessions devoted to hospital and extra-mural problems, clinical pathological studies, therapeutic procedures.

Thursday evening, 468 members and guests attended 12 round table dinner discussions, the subjects being child psychiatry, occupational therapy, psychiatric nursing, psychoanalysis, psychiatric private practice, psychosomatic relationship, scientific methods in psychiatry, The Veterans' Administration, tuberculosis in mental hospitals, forensic psychiatry, hypoglycemic treatment, and private psychiatric hospitals.

On Friday, there were three sections, including a symposium on hypoglycemia, mental deficiency and general topics.

Located near the meeting halls were scientific and technical exhibits. Various studies from the laboratory and from the field of clinical psychiatry were presented in the form of a scientific exhibit. Because of the practical character of the exhibits shown, the exhibit spaces were visited by a great number of members.

The following scientific exhibits were presented:

Untreated syphilis in the male negro and its relation to the involvement of the central nervous system. A comparative study of treated and untreated cases. The United States Public Health Service, Washington, D. C.

Trends in mental disease in New York State. Department of Mental Hygiene, State of New York, Albany, N. Y.

The psychoses with subacute (bacterial) and chronic verrucose (rheumatic) endocarditis. A clinico-anatomical study. Max A. Bahr, M. D., and Walter L. Bruetsch, M. D., Central State Hospital, Indianapolis, Ind.

Clinical electro-encephalography. W. G. Lennox, M. D., Department of Neurology, Harvard Medical School, Boston, Mass.; A. M. Grass, consulting electrical engineer, Harvard Medical School, Boston, Mass.; Hallowell Davis, M. D., and Pauline Davis, Department of Physiology, Harvard Medical School, Boston, Mass.

Comparative activities of mental hospitals. Mental Hospital Survey Committee, New York, N. Y.

In connection with the scientific exhibit, organized by Dr. Bruetsch, a number of films were also shown at intervals depicting hospital activities.

The commercial exhibits included displays of importance and particular interest to mental hospital administrators.

The Ladies Reception Committee and the Arrangements Committee formulated a program of interesting luncheons, shopping tours, sight seeing trips and other attractive affairs which increased the pleasure of the ladies.

In accordance with the report of the Board of Examiners and upon recommendation of the Council the Association elected 31 to associate membership; 159 to membership; 12 transferred from associate membership to membership; and 11 transferred from membership to fellowship.

The following were elected officers for 1937-1938:

Ross McC. Chapman, M. D., President, Towson, Md.
Richard H. Hutchings, M. D., President-Elect, Utica, N. Y.
William C. Sandy, M. D., Secretary-Treasurer, Harrisburg, Pa.
Council members elected for three years: Charles H. Dolloff, M. D., Concord, N. H.; George S. Johnson, M. D., San Francisco, Calif.; Harry C. Solomon, M. D., Boston, Mass.
Robert P. Winterode, M. D., Crownsville, Md., was elected an auditor for three years.

The following were elected the officers of the sections for 1937-1938:

Section on Convulsive Disorders: S. Bernard Wortis, M. D., Chairman, New York, N. Y., and William G. Lennox, M. D., Secretary, Boston, Mass.
Section on Forensic Psychiatry: Winfred Overholser, M. D., Chairman, New York, N. Y., and James L. McCartney, M. D., Secretary, Catskill, N. Y.
Section on Mental Deficiency: Ransom A. Greene, M. D., Chairman, Waverly, Mass., and Oscar J. Raeder, M. D., Secretary, Boston, Mass.
Section on Psychoanalysis: Nolan D. C. Lewis, M. D., Chairman, New York, N. Y., and Clarence P. Oberndorf, M. D., Secretary, New York, N. Y.

San Francisco, California, was selected for the 94th annual meeting in 1938, the place for headquarters and the exact time to be decided later by the Executive Committee and the local Committee on Arrangements.

The total registration was 1358, of which 500 were members. Forty-two states, Canada and Australia were represented. Since the meeting, many complimentary expressions have been received as to the very satisfactory program and general arrangements.

WILLIAM C. SANDY, M. D., *Secretary.*

CALENDAR OF PSYCHIATRIC MEETINGS.—The American Psychiatric Association is collaborating with The National Committee for Mental Hygiene to keep on file a calendar of psychiatric meetings in all parts of the country. The office of either organization will be gratified to receive dates and programs, and will have this information available for inquiries. It is hoped in this way to avoid conflict between important psychiatric events. For instance, the Salmon Lectures are an outstanding event of the psychiatric year, and it is hoped that other organizations may be able to set the dates of their meetings in such a way as to allow their members to attend these lectures in as many instances as possible.

THE AMERICAN COLLEGE OF PHYSICIANS 1938 MEETING.—The twenty-second annual session of the American College of Physicians will be held in New York City, with headquarters at the Waldorf-Astoria Hotel, April 4-8, 1938.

Dr. James H. Means, of Boston, is President of the College, and will have charge of the program of general scientific sessions. Dr. James Alex. Miller, of New York City, has been appointed General Chairman of the Session, and will be in charge of the program of clinics and demonstrations in the hospitals and medical schools and of the program of Round Table Discussions to be conducted at headquarters.

RESIDENCES IN NEUROPSYCHIATRY.—Four residences per year have been approved by the Council on Medical Education and Hospitals of the American Medical Association for the Menninger Sanitarium, Topeka, Kansas. Residency periods now begin January 1, April 1, July 1, and October 1. The candidate for the January 1, 1938 appointment will be chosen October 1; all applications must have been received by September 1 so that the credentials and references can be investigated prior to the appointment of the resident. Minimum requirements for candidacy are graduation from an approved medical school and the completion of an interneship in an approved hospital. The salary for residents is $120 a month without maintenance.

Didactic instruction is arranged with the staff members, and the residents are eligible to attend seminar discussion groups, staff con-

ferences, the sessions of the post graduate courses for nurses and for physicians, and class work in neurology, neuropathology, psychiatry, and psychoanalysis.

Application blanks will be mailed upon request. Address Dr. Karl A. Menninger, Chief-of-Staff, The Menninger Clinic, Topeka, Kansas.

Bureau of Human Heredity, London.—Attention is drawn to the very important service provided by this Bureau, a service to which all those interested in human genetics may contribute, and from which they may likewise derive benefit.

The object of this Bureau is collection on as wide a scale as possible of material dealing with human genetics. Later, the tasks of analysis of material and distribution of the information available will be added.

The Bureau is directed by a Council representing medical and scientific bodies in Great Britain. It is affiliated to the International Human Heredity Committee, which ensures cooperation in all areas where research is proceeding.

The Council would be grateful to receive all available material from Institutions and individuals, furnishing well-authenticated data on the transmission of human traits whatever these may be. Pedigrees are particularly desired; twin studies and statistical researches are also relevant. As research workers and others who send in material may in some cases wish to retain the sole right of publication (or copyright) those who so desire are asked to accompany their material with a statement to that effect.

Material should be given with all available details in regard to source, diagnostic symptoms and the name and address of the person or persons who vouch for accuracy. All such details will be regarded as strictly confidential.

Reprints of published work would be most acceptable. Further, many authors when publishing material may also have collected a number of pedigrees which they have been unable to reproduce in detail. It is the object of the Council that such records, by being included in the Clearing House, should not be lost.

Those wishing for a copy of the Standard International Pedigree Symbols may obtain one from the office.

Announcements in regard to the services undertaken by the Bureau will be published from time to time.

Chairman: Prof. R. Ruggles Gates, F. R. S., 115 Gower St., London W. C. 1, Eng.

Executive Committee: R. A. Fisher, J. B. S. Haldane, E. A. Cockayne, J. A. Fraser Roberts, L. E. Halsey (Hon. Treasurer), C. B. S. Hodson (Hon. Gen. Secretary).

AMERICAN ASSOCIATION ON MENTAL DEFICIENCY, ANNUAL MEETING.—The sixty-first annual meeting of the American Association on Mental Deficiency was held at Haddon Hall, Atlantic City, N. J., May 5-8, 1937. There were thirty-five papers presented which will be published in the Proceedings.

Dr. Harry C. Storrs of Wassaic, N. Y., was elected President. Dr. Neil A. Dayton of Boston, Mass., was elected Vice-President and Dr. E. Arthur Whitney was elected Secretary-Treasurer. These officers to serve for the year 1937-38. Councillors elected for four years were Dr. B. O. Whitten of Clinton, S. C., and Dr. Warren G. Murray of Dixon, Ill. Miss Mabel Matthews of Mansfield Depot, Conn., was elected auditor for three years.

The place of meeting for 1938 will be in Richmond, Va., April 20-23.

The Association has surmounted its financial difficulties and is "out of the red." One hundred and fifty new members were elected to membership at the final business meeting on May 8.

There were many outstanding contributions to the program including papers by the following: Dr. Adrien Blyer of St. Louis, Mo.; Dr. C. A. Mills of Cincinnati, Ohio; Professor Ellsworth Huntington, of New Haven, Conn.; The Hon. Franklin Kirkbride of New York City and Dr. F. V. Willhite of Redfield, S. D.

An interesting innovation of the convention was the bringing of the activities of the various institutions to the convention in place of the usual visits to institutions by those attending the convention. Exhibits of institutional activities were shown by The Training School at Vineland, N. J.; The Elwyn Training School, Elwyn, Pa.; New Lisbon Colony, New Lisbon, N. J.; The Vineland State School, Vineland, N. J.; The Woodbine Colony, Woodbine, N. J.;

The North Jersey Training School, Totowa, N. J., and The Dept. of Institutions and Agencies of the State of New Jersey.

Some 300 members attended the convention.

MEETING OF THE ACADEMY OF PHYSICAL MEDICINE.—The fifteenth annual meeting of the Academy of Physical Medicine will be held at the Hotel Walton, Philadelphia, October 19, 20, 21, 1937.

The Academy, which is international in scope will present a scientific program based on reports of the most recent research and practice of the various specialties. In addition to the lectures, demonstration clinics will be held at the hospitals of the University of Pennsylvania, Jefferson Medical College, and Temple University.

A copy of the program may be had by addressing:

William D. McFee, M. D., Chairman,
Committee on Program and Publication,
41 Bay State Road, Boston, Mass.

Book Reviews.

ADMINISTRATIVE PSYCHIATRY. By *William A. Bryan, M.D.* (New York: W. W. Norton & Co., 1936.)

Books, and even articles in the periodical literature, dealing with the practical problems of operating mental hospitals have been scarce. It is therefore of particular interest to record the appearance of a book on this topic written from a practical viewpoint by a superintendent of long experience and progressive attitude. Doctor Bryan, for over 15 years superintendent of the Worcester (Mass.) State Hospital, has compiled a volume which should be of interest and value to all psychiatrists engaged in institutional practice. Although a book on hospital administration it does not devote itself to the operation of the farm, or the power-plant, or the storehouse; rather it deals with the various aspects of the care of the individual patient, and to the manner in which the hospital may best fulfill its function as a community agency.

After outlining the several methods of state organization, such as boards of control, boards of trustees, departments of welfare and departments of mental hygiene (the New York law is incorrectly stated), the author discusses types of hospital organization, distinguishing the one-man type, the dual-headed type, and (his own preference and practice) what he denominates as the "participative democracy." Doctor Bryan gives the five functions of the mental hospital as: (1) the practice of psychiatry; (2) medicine and surgery; (3) teaching; (4) research; (5) prevention. Chapters are devoted to each of these topics, as well as to such subjects as the nursing problem, group psychotherapy, occupational and industrial therapy, the contribution of social work and public relationships.

One cannot well summarize the chapters; they contain many stimulating suggestions, and should be read *in extenso*. A few points only are mentioned. The author advocates the development of "standard practice" manuals, which will give detailed information as to routine hospital procedures. This manual would be placed in the hands of the staff physicians and of the several department heads; it would be a loose-leaf affair, and subject to continuing revision by a committee of staff members. The advantages of this procedure over the all-too-frequent passing on of tradition by word of mouth are obvious.

A separate medical and surgical service is advised, distinct from the psychiatric service, though definitely an adjunct of the latter. In this service the aid of an active consulting staff should be systematically utilized. Such services, when established, have functioned satisfactorily.

Much stress is laid upon the importance of rapport with the patient, and of establishing in him confidence in the hospital and physicians. Very gratifying results are reported from the use of an orienting letter which is de-

livered to the patient upon admission; radio talks to patients about the work and aims of the hospital, and on mental hygiene, have proved themselves valuable. Still another group-therapeutic procedure is the grading of patients (p. 182). The author is an enthusiastic advocate of family care as an aid in the readjustment of the patient to community life.

The important question of the public attitude toward the hospital, and the means of influencing and improving that attitude, are frankly and constructively discussed, with a number of helpful suggestions.

Whether or not one agrees with all the conclusions and suggestions, the book is practical and forward-looking and should be read by all engaged in mental hospital work. It would be helpful, too, if our newspaper editors and our politicians likewise read it; such perusal would be a step toward establishing a more intelligent public opinion concerning the significant contribution of the mental hospital to the welfare of the community.

WINFRED OVERHOLSER.

TWINS: A STUDY OF HEREDITY AND ENVIRONMENT. By *H. H. Newman, Frank N. Freeman, and Karl J. Holzinger.* (Chicago: University of Chicago Press, 1937.)

The material on which this study is based consists of the following: (1) 50 pairs of monozygotic twins, reared together; (2) 50 pairs of dizygotic twins, reared together, used as a control group; and (3) 19 pairs of monozygotic twins, reared apart. The twin-pairs have been investigated for physical and mental resemblances and differences: stature, weight, head measurements, finger prints, handedness, etc.; intelligence tests, educational achievement tests, temperament tests, etc.

The findings yielded by Stanford-Binet tests are of great psychiatric interest. Among the 50 pairs of monozygotic twins reared together, the I. Q.'s were identical or differed by not more than 5 points in 24 cases; in the remaining 26 cases there were differences up to 20 points. In the group of 50 pairs of dizygotic twins, the I. Q.'s were identical or differed by not more than 5 points in 17 cases; in the remaining 33 cases there were differences up to 40 points.

The contrast between the monozygotic and dizygotic groups is accounted for, of course, by the fact of the identical heredity of the monozygotic twin-pairs. The authors are inclined to attribute the more or less marked differences found in 26 of the monozygotic twin-pairs to prenatal factors, such as inequalities of fetal blood supply and an "asymmetry mechanism" in development. In support of the latter factor the abnormal frequency of left-handedness in one of a pair of monozygotic twins is brought forward. The facts as regards handedness are, however, confusing. It is true that in 24.1 per cent of cases of monozygotic twins one is left-handed, the other right-handed; but among dizygotic twins, too, the same thing is found in 15 per cent of the cases. The authors state, "This is a real mystery which has not yet been cleared up." Moreover, in 3.7 per cent of the cases of monozygotic twins, *both* of each pair are left-handed. In view of the rather overwhelming evi-

dence that is available in other material it seems strange that the authors have failed to take cognizance of the factor of birth injury involving the left cerebral hemisphere as possibly accounting for differences in both intelligence and handedness in monozygotic twin-pairs and for the abnormal frequency of left-handedness among both monozygotic and dizygotic twins.

Among the 19 cases of monozygotic twins reared apart the I. Q.'s were identical or differed by not more than 5 points in 8 instances: 42.1 per cent, as compared with 48.0 in the monozygotic twins reared together. In the remaining 11 pairs there were differences in I. Q. up to 24 points. In other words, in the results of the Stanford-Binet intelligence tests there seems to be no significant difference between the group of monozygotic twins reared together and those reared apart.

A. J. R.

PRACTICAL EXAMINATION OF PERSONALITY AND BEHAVIOR DISORDERS. By *Kenneth E. Appel and Edward A. Strecker.* (New York: The Macmillan Co., 1936.)

The authors of this book state that its purpose is to guide the student in the technique of psychiatric observation, that it is designed to be used in the same way as a laboratory manual, and that it is compiled from the methods they have followed in their teaching.

The book is divided into two parts of exactly one hundred pages each, by a chapter, in the form of a questionnaire, on the emotional health of the medical student. The first part covers the psychiatric examination of adults, the second that of children.

Besides outlining the formal information necessary to be obtained on any case, actual questions which can be asked are included and valuable hints as to how and when to ask the questions are added, so that the student who makes intelligent use of the manual should be greatly aided not only in making his examination but in understanding his case. The chapter on the "Art of Psychiatric Examination" is the meat of the book and the italicized portions, such as, "hastiness and pressure of work prejudices a good examination" and "take the history personally from both family and patient," are well chosen.

The portion of the book concerning children consists of the formal outline with appropriate questions followed by chapters on Parent Child Relationships and Child Guidance Problems.

A comprehensive useful book which can be recommended.

S. G. CHALK,
Toronto.

PSYCHOLOGICAL STUDIES OF HUMAN VARIABILITY. Psychological Monographs. Dodge Commemorative Number. Edited by *Walter R. Miles.* (Princeton: Psychological Review Company, 1936.)

This number of the Monographs (Volume XLVII, No. 2) is presented to Professor Raymond Dodge, on the occasion of his voluntary retirement from

active academic work, as a tribute to 40 years of distinguished service to psychology. It represents an enterprise participated in by former students and colleagues of Professor Dodge, which, to quote the editor, "combines science with friendship." Five introductory articles deal with appreciative, bibliographic, and descriptive statements concerning the contribution to which the entire volume pays tribute; and 29 experimental, historical and theoretical articles follow. These latter all deal with problems rooted in the fundamental work of Professor Dodge, and indicate in a very real way his inspiration to American psychology, the remarkable scope of his work, and the scientific spirit of his investigations.

W. LINE,
University of Toronto.

PROSTITUTION: AN INVESTIGATION OF ITS CAUSES, ESPECIALLY WITH REGARD TO HEREDITARY FACTORS. By *Tage Kemp*. English Translation by *Elsie-Marie Werner Kornerup, B. A.* (Copenhagen: Levin & Munksgaard, Ejnar Munksgaard, 1936.)

This book deals with prostitution and its causes, with special reference to hereditary factors. It is the result of a series of investigations made in Copenhagen between 1931 and 1935, during which time 530 prostitutes were given a medico-psychiatric examination, with special attention paid to inherited traits. The book contains 50 case records in full.

The author approaches his subject from a purely objective standpoint, regarding prostitution as a biological phenomenon without harboring moral or political prejudices. He points out, however, that it is impracticable to avoid entering into the social conditions and legal interpretations which form an ever-present background for this problem. The investigation was begun at the request of Police Superintendent Schepelern-Larsen, who for 30 years has been chief of the Health and Morality Police in Copenhagen. The psychiatric work was done under the general direction of Professor August Wimmer, director of the Psychiatric Clinic of the University of Copenhagen, assisted by Doctor G. E. Schroder and Doctor Max Schmidt. Assistance was rendered in the genetical problems by Professor Oluf Thomsen, the director of the University Institute of General Pathology in Copenhagen.

The book deals with a brief historical account of prostitution; details of the method and extent of investigation; the causal significance of hereditary factors in prostitution; and the relationship of environmental influences in childhood and adolescence. The mental qualities and abnormalities of prostitutes is discussed with reference to bodily illness and with special reference to venereal disease. Conditions affecting adult situations such as poverty, unsatisfactory working conditions, family and social problems are briefly reviewed. The application of correctional procedures and measures is also touched upon.

The last chapter of the book is devoted to a summary and conclusion, followed by a fairly complete bibliography.

The author points out that only 29.4 per cent of the cases examined were mentally normal or without defective intelligence. Of those examined 22.5 per cent were pronounced psychopaths; 0.8 per cent were imbeciles; 6.8 per cent were morons; 19.1 per cent were regarded as dullards; and 23.2 per cent were below the average or retarded, whereas 36 per cent had committed actual criminal offenses.

The study indicates that the majority of prostitutes are below normal mentally, but this abnormality was insufficient for a court to declare such individuals incapable of managing their affairs. It was thought from the study that they belong to a "borderline" group of psychopathic characters and that many of the same type were found among the collaterals of their family. All seemed to lack the ability to properly adjust themselves socially or they were actually anti-social in their adaptations.

The case records cited illustrate the way in which society deals with these borderline groups, often highly unsuited for the purpose, and that legislation and administration of the subject has frequently proven unsatisfactory. The author comments that "if we reflect to where and how widely eugenic sterilization could have been advantageously undertaken in these families, we come to the conclusion that the possibility of carrying out rational, effectual sterilization on a firm scientific basis, on a certain social group such as is represented here is in reality slight."

The ways and means suggested by the author to improve the existing conditions would include an educational program for parents, guardians, school authorities, homes, reformatories, police authorities and courts with reference to psychopathic abnormalities of the borderline type; with the necessity for obtaining psychiatric assistance and guidance for the disposition and treatment of such persons; and with such regulations as may be necessary for the extensive use of psychiatric examinations in connection with the legal disposition of prostitutes.

The author also calls attention to the necessity for permanent community supervision of the "slightly mentally defective person" not requiring institutional care by such agencies as boards of guardians that may exercise supervision over adolescents and the general supervision of persons discharged from homes, reformatories, mental hospitals, and those released from prisons and workhouses.

The recommendation again appears to the effect that efforts should be made to detect the difficult and mentally defective children already in school, and to arrange for the special training of those who cannot profit by the usual course of study, keeping such persons under constant guidance during the compulsory education period. The book recommends, for mentally abnormal prostitutes who are not defective enough to be placed in mental hospitals or institutions for the feebleminded, that they not be subjected to police control, fines and imprisonment, but be placed under some type of provident care and control, or perhaps in an institution especially suited to their needs. The need for "morality police," cooperating with public welfare institutions more extensively than has been the custom, is recommended,

and that the practice of imprisoning and fining prostitutes such as is now the case is neither suitable nor necessary for the solution of the problem. The author recommends the general reduction of social inequality and especially the improvement of working conditions for female domestic servants.

W. L. T.

HINTS TO PROBATIONERS IN MENTAL HOSPITALS. Third edition. By *Richard Eager, O. B. E., M. D.* (London: H. K. Lewis and Co., Ltd., 1936.)

This book is, as implied in the title, chiefly a list of little rules of procedure for nurses in mental hospitals. In its original form this was apparently all it was intended to be; this edition, however, states that its purpose is to be generally useful to mental nurses. It cannot be said that this purpose is entirely fulfilled.

The book opens with these words, "It is generally accepted to-day that the brain is the organ of mind, and that it is the delicate structure of the brain that is deranged in patients suffering from mental disorder, no matter how minute this may be." This seems to be somewhat contradicted on page 78. "I have already explained that 'mind' is not material. Abnormalities cannot be seen on the post-mortem table. . . . ." Without attempting to discuss the theories in question, it does seem that their presentation would not be entirely clear to nurses-in-training.

Part I includes the actual "Hints to Probationers." These consist of a series of rules "which have stood the test of time," *e. g.*—"Never tackle an excited or violent patient single-handed"; "Never leave the door of your room unlocked." In this section also are a chapter on ward duties, a chapter on psychology, and one on dreams.

Part II is a slight description of "the various forms of mental disorder with the nursing duties in connection with each." This list of mental disorders includes no mention of the milder or borderline disabilities, or of the maladjustments of children; and the book contains no single reference to any possibility of prevention, and therefore, of course, nothing on the nursing aspects of these matters. There is no attempt to describe the whole programme of attack on mental disease, and no information as to the available facilities for treating it. As for nursing itself, as here presented it would appear to consist not only in part but entirely of the most elementary routine ward duties.

Reliable sources of knowledge of psychiatric nursing are so few that one should welcome an attempt by an authority to deal with the subject. One feels however, that the content of this branch of nursing is still largely to be discovered and organized; and that a rather fuller presentation, for nurses, of psychiatry itself would be a better basis on which to build a nursing text.

N. D. FIDLER, REG. N.
University of Toronto.

PRISONS AND BEYOND. By *Sanford Bates.* (New York: The Macmillan Company, 1936.)

Although written from the standpoint of the prison executive, "Prisons and Beyond" is a book that not only indicates problems in prison management but has particular interest for the psychiatrist in that it points the way toward a more scientific, effective and humane treatment program for those convicted of crime.

Imprisonment, as we use it today, is of comparatively recent origin and certainly the particular problems it raises developed simultaneously with our industrial expansion. Imprisonment was by no means the first method of dealing with culprits and although it is now practically the only one employed, Sanford Bates indicates that other forms of management might well supplant the current fad.

With the thesis that the end and aim of a penal system is the protection of society and not individual or social vengeance, the problem immediately raised is how society can best be protected against the criminal. Certainly not by maltreating him in an institution for a year or more. If our present statistics on recidivism are discouraging the deficiencies in our present methods of treating prisoners may well be the reason. As this very interesting book is read one loses any respect he might have had for the various theories of penology except those directed toward a constructed rehabilitation of the individual and which are intended to help him resume a place in society. Certainly these worthwhile theories are emasculated by our present practice of attempting to salve the wounded feelings of society by the imposition of some definite period of time which must be served before the offender can be considered eligible for treatment.

Mr. Bates emphasizes that the modern institution must make full use of the knowledge which the psychiatrist, the psychologist, and the sociologist may contribute toward the solution of its problems. "The psychiatrist," he says, "or character analyst, or therapist, or whatever he may be called is in prison work to stay. No approach can be made to the solution of the problem of individual rehabilitation without his insight and assistance." But here he adds a word of admonition, not to say—a warning: "He (the psychiatrist) must now content himself, however, with diagnosis. He has been too prone in the past to tell us what was wrong with our offenders without going into the necessary details of what should be done to correct and cure these defects." This is a point which is well taken but it is not entirely the psychiatrist's fault; even Mr. Bates has not been able to suggest to the psychiatrist how he can develop, among an untrained group of prison guards, adequate insight to carry out intelligently the few treatment suggestions which he may make. And this, it goes without saying, is an essential prerequisite to good psychiatric work directed toward the development of social attitudes in individuals whose previous conditioning has been along antisocial lines and who are only too eager to pounce upon their keepers' scoffing at the "bug doctor" as an excuse to avoid exposing themselves to any therapy he may be able to dispense. By implication, at least, Mr. Bates shows that

he is aware of this fundamental difficulty and indicates that its solution may be found in the present civil service system used in the federal service. He describes the training and promotion plan as being conducive to the development of a qualified personnel. With the exception of the chief administrator and two or three wardens, every member of the federal prison system is under civil service. Promotions are made from the ranks and study courses are provided for preparation for higher office.

The federal prison system as described in "Prisons and Beyond" now consists of 12 institutions graduated from work camps, with minimum security, through reformatories of medium security, to the widely publicized Alcatraz, a super-maximum security prison for incorrigibles and long-term offenders. The camps and reformatories stimulate our interest but it is difficult to imagine psychiatry accomplishing anything worthwhile in that forbidding island fortress which looms out of the fog of San Francisco Bay.

Is segregation the only answer to crime?

It has come to be accepted as such. But, as Bates points out, there are alternatives which may prove to be more practical, parole, probation, restitution and industrial colonies. Massachusetts, for instance, has twice as many men under probation as are in its prisons, and the Massachusetts' penal system compares favorably with that of any other state. The Russian industrial colonies appear to be showing favorable results.

The criminology of the future should be free of any notion of punishment. Punishment does not pay society. The sadistic thrill of a few individuals who enjoy a good hanging or the increased circulation of a sensational press indulging in an hysterical "crime drive" are too dearly bought to be tolerated. Sound economics, as well as humane thinking, demand that each offender be treated in accordance with his own potentialities and it is requisite that the forms of treatment available be as varied as is necessary to meet individual requirements. Perhaps we may even envision what might be a Corrective University of the future.

No consideration of crime would be complete without considerable attention to the problem of prevention. On this point "Prisons and Beyond" is lacking. But perhaps Mr. Bates' answer is expressed in his recent resignation as administrator of the federal prison system. He became director of the Boys' Clubs of America.

MARVIN SUKOV,
Chicago.

ESSAI SUR LA SCHIZOPHASIE. By *Jacques Delmond.* (Paris: Librarie E. Le François, 1935.)

In the study of abnormal, or for that matter of normal speech, one is faced with many obstacles and Delmond rightfully points out how difficult it is to take an objective attitude and to free oneself of certain established theories and to remain within the frame of the problem. With these apologetic remarks the author embarks himself on a presentation of a concept of schizophasia. He traces first the historical development of the problem. Schizophasia

as it is known was introduced by Kraepelin as a type of dementia præcox in 1910. Kraepelin described this group at that time as a form of dementia with confusion of speech. Since then cases have been reported by Teulié, Schiff and Courtois, Pfersdorff and Pandéroux and a few others. However, Bleuler felt that schizophasia is not a nosological entity since its elements are present in all types of schizophrenia. According to him it is merely the outward manifestation of the underlying fundamental forces and which are considered by him as physiogenic in nature, the psychogenic elements constituting the superstructure. Delmond espouses Bleuler's conception of schizophrenia and proceeds to develop in the present essay the concept of schizophasia along Bleulerian lines.

He defines schizophasia as a schizophrenic incoherence which he believes is a better term than the incoherence of dementia præcox because it is not only incoherence of speech or verbal incoordination or word ataxia but is the result of the fundamental disturbance of thinking. To Delmond this is also more in accord with the concept of Delacroix who defines speech as "the effect of the state of thought" and as "the creation of the total man." In schizophasia, he argues, there is over the verbal incoherence the conceptual incoherence, which are, of course, Bleuler's *Sprachverwirrtheit* and *Begiffverwirrtheit*, the two basic phenomena of schizophasia. What singles out schizophasia as a unity, according to Delmond is the verbal and thought incoherence, the fundamental incoherence conditioned by the primary disturbances which Bleuler defined as "the elementary weakness of the psychic integration—the association disturbance." Incoherence, according to Delmond, is what remains of the patient at any given time in the evolution of dementia præcox. It is a faithful witness of the psychic dissociation, of the intra-psychic ataxia or dysharmony (Stransky, Urstein). While schizophasia is not characteristic of any type of dementia præcox it indicates the intensity of the disturbance in the association processes. Delmond thinks that it first destroys those functions which are acquired with the greatest difficulty, with the result that only a certain word knowledge remains. It is not merely a chaos of syntax and ideas, not only a fragmentation of grammar but a conceptual incoherence. The author mentions Krafft-Ebing who believed that in schizophrenia the words lose their meaning and that they become, so to speak, empty envelopes. He also refers to Bleuler who disputed this conception and who suggested that the envelopes are filled with new contents. The question of neologisms is mentioned and the author rightfully feels that they should be considered as a part of the problem of schizophasia. But it is rather surprising that Delmond should minimize at the same time the importance of neologisms believing that not even a philologic analysis of neologisms will give the key to psychiatric problems. He thinks that neologisms are more or less well formed grammatically and often depend solely upon the cultural and the previous intellectual level of the patient. He enumerates the various modalities of schizophrenic speech, such as mumbling, unintelligible logorrhœa, affectation and bizarreness and the hyperkinetic verbigeration. Of particular interest is his discussion of the changes in intona-

tion with the monotonous type of speech or the speech which is colored by paradoxical affectivity. He also mentions the grandiloquent and the histrionic types of speech. Changes in timbre and the superimposed abnormal noises are considered. Other disturbances are the dyslalias with changes in rhythm and articulation. Here also belong the compulsive thinking with echolalia and palilalia; the impulsiveness with logorrhœa and verbigeration; the hyperkinesis with the tendency to endless recapitulations. As samples of verbal disturbances he mentions elisions and amorphous neologisms; in the nominal disturbances there are changes in the meaning of words; in the syntactic disturbances there is the so-called telegraphic speech and in the semantic disturbances the ambivalence, ambitendence, negativism, symbolism and approximation of thinking.

Using Head's method of examination of aphasic speech Delmond tries to analyze the schizophrenic speech at its different levels of disintegration. He singles out the verbal disturbances with the word salad or the jargon-aphasia, the nominal disturbances with the neologisms and paralogisms, the syntactic disturbances with the interpolations, the simple and complicated syntactical disturbances, the so-called paragrammatisms of Bleuler (the pure form of schizophasia), the semantic disturbances with the philologic interpretations and the dominations of the musical elements and the approximation of meaning.

Goldstein's concepts of the four types of speech are also utilized in the analysis of schizophasia, which all brings Delmond to the conclusions that there is a close relationship between the aphasic disturbances of organic origin, the speech in dementia præcox and the speech under emotional stress, fear and fatigue.

Delmond describes the methods he used in study of schizophasia and of particular interest are his phonographic recordings of the productions. This method affords registration of the rapidity of speech, the phonetic disturbances, the strangeness and many other phenomena which otherwise would escape analysis.

At the end of the review one is tempted to return to the author's introductory remarks in which he expresses the belief that speech is inseparable from all other acts of life and that it not only serves the purpose of communication but that "we express ourselves entirely in speech." Having gone so far one wonders why the essayist did not consider more fully the emotional forces behind the schizophrenic speech. All in all this is a welcome contribution. Such studies may bring us to a better understanding of abnormal and perhaps even of the so-called normal human speech which, should Sir Richard Paget be correct, "is still in a very primitive and barbarous condition."

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THE MENTALLY ILL IN AMERICA. A HISTORY OF THEIR CARE AND TREATMENT FROM COLONIAL TIMES. By *Albert Deutsch*. (New York: Doubleday, Doran & Co. Inc., 1937.)

This is a book which may be characterized at once as indispensable for any one working or wishing to inform himself in the field of human welfare. The care of the socalled insane has always been a social problem; it is only within recent years that it has been generally recognized as primarily a medical issue. But with this shifting of emphasis which made possible the birth of modern psychiatry the problem of the mentally ill lost none of its social significance; rather the corrective reorientation stressed the social aspect: and since the question of treatment has always been the concern of the constituted authorities of larger or smaller governmental jurisdictions, psychiatry has hitherto been the sole branch of the healing art to be dealt with as state medicine.

The author of this history has accomplished an admirable research and has assembled a wealth of invaluable material which otherwise must have remained in large part inaccessible. He has presented the story to date of society's ways of dealing with the mentally ill, paying due attention to the administrative, economic, legal and medical aspects of the problem, and to the successive theories and motives which have actuated the changing attitude of governments and communities as humane and scientific procedures have gradually replaced repressive and fantastically brutal ones.

An enumeration of chapter headings will indicate the wide sweep of this work. Under "Prophets, Demons and Witches" the author supplies the necessary historical background, from the Egypt of antiquity onward, upon which to trace the development of the modern science of psychiatry. The outstanding names in Greek and Roman medicine and their contributions are passed in review, reminding us that much that is good in the views and methods of today is of Greek origin. The fantastic theories and procedures of the Middle Ages gave way in the revival of classical learning, and at length special institutions were built—presumably first by the Moslems—for housing mental patients. The first in Europe of which there is indisputable record was built in Valencia, Spain, in 1408.

After discussing the plague of witchcraft which blighted too many centuries (the laws against witchcraft in the United Kingdom were not repealed until 1736), Mr. Deutsch launches into the main theme of his book in the chapter on "Colonial America: the Old World Heritage." The colonists had brought with them the old-world traditions, reflecting the worst of mediæval thought regarding mental illness; add to this the low plane of medical knowledge generally during the colonial period (the first medical school in America was established in Philadelphia in 1765), and it is not difficult to understand the poor estate of the mentally afflicted prior to the close of the 18th century.

Therapeutic efforts would naturally be patterned after those of the mother land. Characteristic was the famous remedy for epilepsy horrifically named "Spirit of Skull," a vinous concoction of "moss from the skull of a dead man unburied who had died a violent death." Charles II in his fatal illness was given the benefit of this mixture. Provision for the mentally ill during

colonial times is fairly summed up by the author in the words: "Punishment, Repression and Indifference."

But the humanitarian movement of the 18th century was destined to bear fruit. Under the influence of Thomas Paine, Benjamin Franklin and notably the Society of Friends, experiments in social welfare were initiated in America and thought was turned to the improvement of the lot of the socially disabled.

Mental patients were accommodated, in the cellar it is true, in the newly completed Pennsylvania Hospital (1765), and at Williamsburg, Virginia, was opened the first institution devoted exclusively to the mentally ill (1773). The methods of treatment were harsh enough; they were lingering echoes of the punishment and repression of the earlier period but not of its indifference. That was the significant thing; the point of view had changed. Coercive and painful measures which we should now look upon as barbarous were at least thoughtfully applied, and with the sincere purpose of ameliorating desperate conditions of which medical science still knew so little.

We come to the chapter "Benjamin Rush—the Father of American Psychiatry." This great physician (1745-1813), fellow-townsman of Benjamin Franklin, was the first American teacher of psychiatry and author of the first American textbook on the subject, *Medical Inquiries and Observation upon the Diseases of the Mind* (1812).

The attention which through the influence of Rush came to be focussed upon the subject of mental disease and its treatment was due not alone to the fact that he was the first exponent of the subject in the American colonies, but perhaps much more to the fact that he was one of the foremost public men of his time. He was the most famous physician in Philadelphia, then the medical center of America; he was foremost in every reform movement, an educationist of great foresight, an advocate of temperance, an enemy of slavery. He was one of the signers of the Declaration of Independence. His proposal, still unheeded a century and a quarter after his death, of an institution for the education and training of statesmen as men in other professions must be trained before they can be regarded as qualified to practice, deserves to be considered along with Plato's discussion of the ideal state.

In the treatment of the mentally ill, although Rush did not emancipate himself entirely from the crudities and even cruelties of his epoch, humanitarian reform was still the key-note of his program. He was the first to enunciate clearly the doctrine of proper segregation of patients, of engaging men and women of better type to serve as attendants, of the use of occupation, exercise and diversion as treatment measures, of improvement generally of the living conditions of the mentally afflicted. In America, Benjamin Rush sponsored the reforms which Pinel stood for in France, Tuke in England, Chiarugi in Italy.

In a chapter entitled "The Rise of Moral Treatment" we are introduced to the further flowering of the reform movement extending roughly over the first quarter of the 19th century. The pendulum had swung well over. The gentle methods of Pinel, the peaceful atmosphere of "The Retreat" at York were having their transatlantic effects. Kindness and friendliness

were replacing chains. "To fetter strong madness in a silken thread" was the ideal of the Friends' Asylum, American counterpart of the York Retreat, opened at Frankford, Pennsylvania, in 1817.

By 1825 there were institutions for the mentally ill in nine states, Virginia being the only state having two. This handful of asylums could of course provide for only a small fraction of the total number of persons requiring care, and it was inevitably the dependent patients who were chiefly neglected.

The next quarter of a century was mainly one of "Retrogression." Society had become conscious of the magnitude of the problem of pauperism so largely contributed to by the indigent insane and defectives. Public officials were alarmed by the cost of asylum building, indigent and irresponsible persons were "passed on" from town to town or "dumped" in dead of night on neighboring communities, or they were auctioned off to individuals or families who would undertake to keep them at the cheapest rate, sometimes as low as 25 cents per week.

It was the epoch of the "Poor House." These catch-alls, few in number at the beginning of the century, multiplied rapidly during the 1820's, until by 1830 they were to be found in nearly every state in the Union. These receptacles, mismanaged and ill-maintained, housed indiscriminately indigents, defectives and insane of all ages; some of the reports of these places which one may read in this book are harrowing indeed. The "Poor House" was indeed a poor house; its cost was small and it was an exceedingly poor place in which human beings must live. While there were some exceptions, "the road that led over the hill to the poorhouse proved to be a *Via Dalorosa* for those unfortunate creatures driven along it."

During this time while one side of the social picture was dark, on another there was a remarkable outburst of optimism. While the fortunes of the indigent insane were at their lowest ebb those of their more fortunate brethren in the larger institutions were lighted with gold promises. From the hitherto pessimistic outlook for the future of the mental patient—"once insane, always insane"—the pendulum of prognosis rapidly swung through 180 degrees. It was no less a man than Dr. Francis Willis, physician to King George the Third during his recurring periods of alienation, who in the course of the parliamentary investigation into the King's illness boasted somewhat injudiciously that he had cured nine of every ten mental patients treated in his private asylum. Although ridiculed by other physicians of the time, the statement of Willis gave impetus to a movement which developed into a veritable "Cult of Curability," to which Deutsch devotes a separate chapter. Superintendents vied with each other in recording favorable results; they entered upon an amazing statistical race, the numbers of cures among discharged cases mounting steadily to 80 and 90 per cent. The bull's eye was finally struck in 1843 when Dr. William M. Awl, head of the Ohio State Lunatic Hospital at Columbus, made this entry in his statistical report: "Per cent of recoveries on all recent cases discharged the present year 100." This feat gained for the Ohio hospital superintendent the sobriquet "Dr. Cure-Awl."

The curability cult reached its peak about 1850, after which under accumulating protests and criticism it slowly waned. Its death blow was delivered

by Dr. Pliny Earle, himself previously a subscriber to the 90 per cent curability fallacy, who devoted many years to the patient study of hospital records and the assembling of reliable data. These he finally gathered together in his epochal book *The Curability of Insanity* (1887) which turned the tide of prognostic optimism into a more healthy channel. But it would be a mistake to regard the Cult of Curability as defunct. A few years ago the elimination of focal infections was credited with 80 per cent recoveries; and lately similar results have been reported in the insulin treatment of schizophrenia.

In a chapter on Dorothea Dix (1802-1887), the author presents a fairly detailed study of the life and magnificent work of this militant crusader of the mid-nineteenth century. Her zeal for improving the lot of the mentally ill took her from one end of the country to the other, and to Canada, Great Britain and the Continent as well. To her credit stand the establishing or enlarging of mental hospitals in 20 states, in several states of more than one. She was instrumental in the founding of the Government Hospital for the Insane at Washington. "In all, she was directly responsible for the founding or enlarging of 32 mental hospitals in the United States and abroad." In the estimation of her contemporary, Dr. Charles H. Nichols of Bloomingdale Hospital, Dorothea Dix was "the most useful and distinguished woman America has yet produced."

We are next introduced to the "Mid-Century Psychiatrists," and particularly to "The Original Thirteen," that distinguished group of hospital superintendents who met in Philadelphia in 1844 and founded the Association of Medical Superintendents of American Institutions for the Insane, now known as The American Psychiatric Association. The work of these founders was truly pioneer work. Psychiatric knowledge and practice had advanced very little since the days of Rush. It was necessary to resurvey the whole field, to bring together such factual data as were available, to set up standards in all phases of the work and thus lay the foundation for future progress and for the development of psychiatry as a scientific discipline. The foundation laid by "The Original Thirteen" was well and truly laid.

Brief biographical sketches together with the individual contributions of the founding fathers will be found in this chapter.

From this point onward the activities of organized psychiatry on this continent may be traced. Modern psychiatry dated from this period. The first modern textbook, Griesinger's *Pathologie und Therapie der psychischen Krankheiten*, appeared in Germany in 1845.

One of the most vigorously and often bitterly debated questions of the day, and indeed for many years, was that of non-restraint, first introduced at Lincoln Asylum, England, in 1837, and later developed by Conolly into a complete system of hospital management. Conolly's work *The Treatment of the Insane Without Mechanical Restraints* was published in 1856. The vicissitudes of the non-restraint doctrine are set forth in some detail. Today mechanical restraint is a thing of the past in all mental institutions deserving the name of hospitals. That it is still in vogue in some parts of the country is evidence of the painful slowness with which modern methods,

even the most obviously indicated and necessary, can become universally accepted and practiced.

A unique and highly significant feature of the social problem of mental illness has been the proposition that "the insane are the wards of the state," with the consequent evolution of "state care." The necessity of state care was virtually recognized in 1751 by the provincial legislature of Pennsylvania in the establishment of the Pennsylvania Hospital at Philadelphia, and by Virginia in 1769 in founding the Lunatic Hospital at Williamsburg. By the middle of the last century it had become evident, first, that in spite of a greatly increased building program throughout the country, the provision of accommodation for patients was not keeping up with the demand; second, that the poorhouse movement was not a solution, but rather a retrograde step. It was not until 1890 however, that the state of New York, after long years of debate, passed the State Care Act which was a triumph of progressive legislation and largely set the pace for progress elsewhere. Justly it may be said that with this act was inaugurated the modern administrative phase of American psychiatry. It established the principle that the state was responsible for the care of *all* its indigent insane, thus providing for the removal of all such cases from almshouses to state-maintained properly staffed institutions, the names of which it ordered changed from "asylums" to "hospitals," symbolizing in this way the treatment objectives which had superseded the custodial.

A county care plan as opposed to state care was adopted in Wisconsin and a few other states, but the majority followed the lead of New York; some 24 states have organized effective systems of state care. Too many states, however, are still in the backward column, with no well worked out administrative provisions for the treatment of the mentally ill within their jurisdictions.

Until near the close of the nineteenth century psychiatry enjoyed the unenviable distinction of being "the Cinderella of Medicine." It was cloistered within the walls of the large over-crowded public institutions; extramural interests and activities were almost non-existent; there was hardly any affiliation with other branches of medicine; it was distinctly outside the main stream of medical progress; its scientific aspect was relatively little developed, its contribution to medical literature meagre; therapy was largely of the expectant type; the provision in medical school curricula for instruction in mental diseases was woefully inadequate. The very name of the organized body of psychiatrists, "the Association of Medical Superintendents of American Institutions for the Insane," typified its isolation.

In this state of affairs the Association changed its name in 1893 to "the American Medico-Psychological Association," and in addition took a very courageous step. It invited Dr. S. Weir Mitchell to deliver the annual address at the semi-centennial meeting the following year in Philadelphia and to criticize "boldy and with no regard to persons." Dr. Mitchell carried out with painful thoroughness his "uncongenial task of being disagreeable"; indeed in some respects he overstepped the mark. The purpose had been served however, and the Association welcomed the stimulus to carry forward reforms and initiate new activities which it knew were long overdue. Or-

ganized psychiatric research was begun with the establishment the very next year (1895) of the Pathological Institute of the New York State Hospitals, already provided for in the epochal State Care Act of 1890. The changes which the four succeeding decades have witnessed have been nothing less than phenomenal; but they are familiar to present day readers and need not be recited here. Mr. Deutsch deals with them fully in his chapter "Psychiatry Emerges from Isolation."

His next topic is "The Mental Hygiene Movements and Its Founder." We have now reached the opening decade of the 20th century. It was the time of the "beginnings of organized preventive medicine." Within this decade arose four national welfare organizations whose objective was the conservation of health rather than the cure of disease. These were the National Tuberculosis Association, the American Social Hygiene Association, the American Child Health Association and the National Committee for Mental Hygiene.

While, therefore, as the author observes, "the social climate was propitious" for the inception of the mental hygiene movement the circumstances surrounding its origin and promoting its development were unique. No other movement in social welfare has been so intimately bound up from first to last with the personality of one man. The story of Clifford Whittingham Beers is well told in this book—his three years' incarceration (1900-03) in mental hospitals in Connecticut, his high resolve that the bitter experience of hospital abuses should be turned to account, his careful planning and consultations regarding steps to take, the publication of his autobiography *A Mind That Found Itself* (1908), the founding of the Connecticut Society for Mental Hygiene the same year, and of the National Committee for Mental Hygiene in 1909. The gradual expansion of the committee's work is carefully detailed—its war and post-war activities, the promotion of psychiatric social work, the child guidance movement, mental hygiene in prison clinics, in industry, in education. Concurrently there was taking place an expansion of the mental hygiene movement throughout the world; in 1928 came the establishment of the American Foundation for Mental Hygiene, and in 1930 was held in Washington, D. C., the epochal First International Congress on Mental Hygiene, attended by delegates from 50 countries exclusive of the United States and possessions, the first world assembly in history of all those working in the field of mental health. The idea of such a world movement for the sake of the mentally ill had taken form in the mind of Mr. Beers while still himself a hospital patient. In his dream he saw his ultimate goal before he had taken his first step. Visionary his friends regarded it. But this was one of the "delusions of grandeur" which came true.

It is too early to gauge accurately the full significance of the mental hygiene movement, but we may feel assured that when the history of twentieth century psychiatry comes to be written it will rank among the few great advances in this field, and we may agree with Dr. G. Alder Blumer that the name of Clifford Beers will stand "with those of Philippe Pinel. William Tuke and Dorothea Dix."

The subject of mental defect is set forth in a separate section including a survey of "Historical Backgrounds" and "Changing Concepts in Mental

Defect." Former and present day views as to the nature and causes of the disability are considered, together with its social significance and the various methods of dealing with it.

Another chapter is devoted to "Insanity and the Criminal Law." Here are reviewed the principal criteria which from time to time have been set up for determining criminal responsibility, culminating in the legal tests emanating from the famous M'Naughten case (1843).

Briefly the author refers to current abuses in the matter of expert testimony and to the disgraceful exhibition of the all too frequent "battle of the experts." While recognizing that the prevailing rules of criminal practice are primarily responsible for the situation he justly observes that psychiatrists "are not wholly free from blame, since they permit themselves to become parties to this procedure."

One of the most illuminating chapters is that which treats of "Our Commitment Laws." It is recalled that the earliest legislation governing the disposal of the mentally ill (the first New York State law dates from 1788) had nothing to do with the welfare or even the rights of the afflicted persons; it was directed solely to the protection of society from those believed dangerous to be at large—the "furiously mad" as the New York law put it. The various laws, sound and unsound, which have successively come into force in the several states illustrate strikingly the changing social attitude toward mental illness and incidentally the degree of public enlightenment as to its nature. While orientation has gradually shifted from the standpoint of protection of the public toward that of the welfare of the patient, there is still no uniformity and there are still too many shortcomings in current commitment procedures. The disgraceful trial by jury, for example, is still in vogue. "There is no ground for complacency in viewing the present state of our commitment laws. Progress still moves with the pace of a sloth. Obstructionist forces of all kinds still place barriers in the path of progress. . . . . Let us not be satisfied with the fact that the trend toward more humane commitment laws is evident: it is necessary to mobilize our forces for the rapid acceleration of that trend."

Discussing "Modern Trends in Institutional Care," Deutsch calls attention to the array of developments in therapy and institutional organization during the past few decades which have made the best of our modern hospitals what they are. He points out that these advances are far from uniform. "Standards may be poles apart in different states, or among hospitals within a given state." Twenty-five years ago Thomas W. Salmon remarked that "every stage in the long and painful history of the care of the insane from 1537, when the first institution for the insane in England was provided, could be actually witnessed in some American community this afternoon"—a statement which still contains much truth.

Psychiatry represents the original form of state medicine. With the setting up of the proposition that the insane are wards of the state and with the general adoption of the principle of state care, the practice of institutional psychiatry—the only psychiatry until the turn of the century—has ever been in some manner or degree under governmental dictation. Its belated progress as compared with other medical disciplines is in considerable measure

due to that fact. From the beginning it has had to struggle under the plague of political meddling and with the vice of the spoils system. These evils the author handles without gloves, with some unsavory illustrations from the past and some almost unbelievable features of political mismanagement in various states disclosed within the last three years by an enquiry conducted by the Committee on Standards and Policies of The American Psychiatric Association. The manuscript of this book was completed too soon to include reference to the latest major example of mischievous political interference, namely the recent upheaval in the state of Massachusetts.

In a final chapter entitled "Towards Mental Hygiene" the author endeavors to give a picture of present day psychiatry from the standpoint of psychiatry itself, with due reference to some of the great teachers who in the past four or five decades have virtually built up a new science. The first of these was Kraepelin, justly called the father of modern psychiatry. While paying tribute to the achievements of this great pioneer the author hardly does full justice to Kraepelin's foundation work. Those who have followed the successive editions of Kraepelin's monumental treatise will hardly agree that his conceptions were "static"; and that they were characterized by "extreme dogmatism" is an unfortunate misstatement.

The author takes note of the diversity of views and approaches which characterize the psychiatry of today in contrast with that of the end of the last century. The psychoanalytic school he treats with fairness, noting both the favorable and unfavorable aspects of Freudian theory and practice. The final pages are thoroughly up-to-date for they contain discussions of such new procedures as narcosis therapy, insulin shock and convulsive therapy.

It is impossible even in so extended a review as this to reflect the enormous research which has gone into the making of this work. The scope of this research is indicated in the 18 page bibliography at the end of the book which is conveniently arranged by chapters. Here are found not only the relevant treatises and professional works but a wealth of citations from local and state records, institutional archives and reports, court proceedings, reports of special committees, legislative enactments, society proceedings, government publications and periodical literature. It is the first time that such a body of information has been brought together and its value is very great. As a work of reference it may be consulted confidently by the writer or speaker on almost any phase of administrative and state psychiatry and mental hygiene; and it is to be hoped that it will find its way to the desks of all governing bodies of public institutions for the mentally ill.

A work of this kind should be required reading for the student of psychiatry to furnish him with a reliable and comprehensive historical background. It traces for him the development of the subject through the phases of neglect, custodial care, empiricism, research and rational therapy, and finally prevention, which is the keynote of mental hygiene. The real significance of modern mental hygiene can only be grasped by a knowledge such as this book supplies of the antecedent conditions out of which this great humanitarian movement sprung.

The book is well indexed and contains eight illustrations.

C. B. F.

In Memoriam.

S. A. KINNIER WILSON.

1878-1937.

The death of Kinnier Wilson on May 12, 1937, removes from the neurological and psychiatric world an outstanding personality and a brilliant thinker.

Born in New Jersey, U. S. A., in early boyhood he came with his sister and his widowed mother to the latter's native home in Scotland. After his preliminary education in an Edinburgh day school he went on to Edinburgh University where he received both his academic and his medical education.

After graduation in 1902 he was house physician to Sir Byrom Bramwell, under whose inspiration he threw himself with wholehearted devotion into the study of neurology to which he was henceforward to devote his life.

After a period of study under Pierre Marie at Bicêtre and in German clinics, he began his connection with the National Hospital, Queen Square, London, where he was to become an ornament of that group of neurologists which has lent such distinction to British neurology. There he was respectively house physician, registrar, pathologist, physician for out-patients, honorary physician. His hospital connections, however, were not limited to the National Hospital. For a time he was assistant physician at the Westminster Hospital and later physician and neurologist to King's College Hospital, and was consulting neurologist of the Metropolitan Asylums Board which had control of the large number of mental patients under the care of the London County Council.

From the beginning of his activity he was continuously productive, showing in all his communications keen clinical observation, thoughtful analysis of the problems presented, a broad grasp of the literature of the subject and a masterly form of presentation. His great ability was soon recognized by the neurological world, but his world-wide reputation was established when he published in 1911 his doctoral thesis on "*Progressive Lenticular Degenera-*

tion: A Familial Nervous Disease Associated with Cirrhosis of the Liver." In this contribution he threw an entirely new light on the rôle of the corpus striatum and on its relation to abnormal tone and dystonic movements. His discovery opened up a novel field of investigation, and the study of extra-pyramidal disorders, so industriously cultivated during the past twenty years, received its primary impetus from this epoch-making work of Wilson. It was natural that the clinical condition which he had first so clearly described and analyzed should henceforth be associated with his name as Wilson's Disease. Further experimental investigations of the rôle of the basal ganglia were interrupted by the war, after which he continued with his clinical investigations which covered the broad field of neurology.

The quality of his work and his masterly style are perhaps most clearly displayed in "*Modern Problems in Neurology*" published in 1928, a collection of papers dealing with present day neurological problems and presented before various medical societies.

Another witness to his ability and breadth of view is *The Journal of Neurology and Psychopathology* of which he became editor in 1920 and which bore the very distinct imprint of his personality.

He lectured before many societies both at home and abroad. Foreign countries delighted to honor him, and he was a member of neurological societies in France, Germany, Italy, Poland, Austria, America, Japan and Denmark. He was president of the sections of Neurology and of Psychiatry of The Royal Society of Medicine. He was secretary general of The International Neurological Congress in 1935. He made several visits to America which were a source of great satisfaction to him and from which, with his keen sense of humor, he derived no little amusement.

The mere record of his professional work and accomplishments fails to do justice to his many-sided and complex nature. In his neurological papers one is at once impressed by his clarity of thought, his style of presentation, his happy phrasing, his lambent humor. He was a dynamic personality; he made a deep impression upon his students. His judgments were clear-cut and outspoken. He was intolerant of the second-rate and he showed by his example what was meant by the first-rate. He got great joy out of the many aspects of life, and those who partook of his genial hospitality

were left with the impression of a rare experience. With his great ability and driving ambition there were many situations which irked him but his energy and pertinacity enabled him to attain his goals.

It is a great loss to neurology that the final fruition of his labors, "*The Textbook of Neurology*" on which he had been at work for a considerable time, had not been finished at the time of his death.

He married the daughter of the late Dr. Alexander Bruce, of Edinburgh, the well-known neurologist, and the deep satisfaction of his family life gave a suitable complement to his brilliant professional career.

C. M. C.

THE CAMPAIGN AGAINST EPILEPSY.*

By WILLIAM G. LENNOX, M. D., Boston, Mass.

I shall attempt an outline of some of the main problems presented by epilepsy and also some of the essential elements in any serious effort to resolve them. I shall consider, first, the care and treatment of patients, as related to both the social and the medical aspects of the problem, and, second, research investigations which attack the etiological foundations of the disorder.

The Care of Epileptics: Social and Economic Problems.

A few statistics concerning epileptics will bear restatement. There are in the United States approximately a half million persons who are or have been subject to seizures. This is about the same number as have diabetes or active tuberculosis. Of the total epileptic population, about one-tenth, or 40,000, have settled out of the community and into state institutions. Of these only about one-fourth are in colonies especially designed for the care of epileptics. Epileptic patients occupy about 10 per cent of the beds in institutions for nervous and mental diseases. The annual cost of caring for these 40,000 epileptic patients is approximately eighteen million dollars.

This small army in institutions and the larger one outside constitute a considerable social and economic burden. This burden we must view not only as members of the guild of physicians, with our traditional circumscribed obligations and outlook, but also as members of society and as taxpayers. In the long run, medical efforts towards the physical well-being of man must mesh with the gears of society's social and economic needs. Granted this position, then a

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series of questions require answering. Is our society sufficiently rich and well organized so that everyone, regardless of whether he is useful or not, can be supported and medically cared for? If there are not enough sustenance and care to go around, should the productive or the nonproductive members of the hive have the honey? Or, phrased for the programs of medicine, should the amount of money and of medical attention which is given to sick persons be influenced by considerations of whether these sick can be brought to a state of economic self-support, and of social usefulness? We doctors attempt to persuade parents not to sacrifice their normal children in order to lavish love and money on the child whose mentality is beyond any hope of repair. Society seems oftentimes proudly to provide lifelong medical and nursing care for the hopelessly defective, and to leave the indigent but mentally normal patient to the chances of charity. In discussing the care of the handicapped, we should consider not only what is being done, but also what might be done if we could plan afresh and in the interest of future society, unembarrassed by tradition or political opinion. We should, however, acknowledge the limitations set by money costs and by the fact that someone must pay the bills.

In terms of prognosis for social usefulness, mental state is of more importance than the frequency or severity of seizures. On the basis of mentality, epileptics can be placed in three groups. The first and largest group—perhaps 60 to 80 per cent of the total—are patients who mentally are normal or nearly normal. Socially as well as numerically important, the great majority of this group are being treated by private physicians or in public clinics and hospitals. A minority, however, in numbers probably running into the thousands, because expert medical attention is not available, or home conditions are unfavorable, or because seizures are frequent, need hospital care. We physicians are at a loss to find a place for them where the cost is reasonable and where other patients and surroundings are stimulating. This first group comprises patients with an I. Q., say, above 80 per cent, a personality which permits living peaceably with other patients, and an outlook which, if seizures can be controlled, justifies the hope of a productive place in society. Each patient successfully treated at this early stage may save the community thousands of dollars in later institutional care.

For these patients, there should be moderate-sized hospitals near medical centers, which are adequately staffed and equipped for thorough examinations and for research, and which provide therapy, and mental and manual training. If, in spite of efforts, the intelligence or the behavior of a patient becomes definitely abnormal, he automatically should be transferred to a lower grade institution, as is the rule at Lingfield, England. Some of these units should be privately supported, permitting admission of patients across state lines. These home-hospitals for the forgotten patient would seem to be a better field for the expression of self-sacrificing devotion by religious organizations than the maintenance of expensive modern city hospitals.

Could some of these units for high grade patients be installed in existing colonies? I have the impression that the heads of colonies doubt the wisdom or the practicability of complete segregation of high grade patients. These form but a small minority, their services help to reduce running expenses of the institution, and the patients themselves are not adversely affected by contact with low grade associates. But relatives and some physicians do not agree to this last point. We are in need of statistical evidence concerning the effect on the mentality of association with much more deteriorated patients. Of course, simple segregation of high grade patients would avail little unless opportunity for manual or mental training and an atmosphere of hope and of expectation were also given them. On the educational side, the Detroit experiment of a sort of boarding public school for epileptic students is worth watching. We need work shelters—and organizations, as in England and South Africa—designed to find employment for epileptics.

To my mind a shining example of an institution embodying some of these ideals is Filadelfia, in Denmark. The studious and courteous Dr. Schou, who is combined administrator and investigator, presides over a 500-bed colony, morally backed by a semi-religious organization. He saves enough out of the 40 cents a day fee from patients to erect a building which is a combined guest house and research laboratory. The next meeting of the International League against Epilepsy will be at this lilac-surrounded institution.

I have seen but one private institution for mentally normal patients in the United States, the Emma Pendleton Bradley Home

of Providence, Rhode Island. In this home, epileptics form but one-fourth of the population of physically handicapped but mentally normal children. According to Superintendent Bradley, the progress of other patients is not retarded by the presence of the epileptics, and the latter benefit from association with patients handicapped in a different manner.

The second and next largest group are those patients who are definitely deteriorated, and short of some miracle can never again be useful members of society. They number perhaps 20 to 40 per cent of the whole. Yet they have once been fairly normal and even now are able to feed and clothe themselves and enjoy small pleasures, and do small tasks. Many, perhaps a third, are gathered in tax-supported institutions, where physically sheltered and medically protected, their lives are prolonged. The annual rate of turnover in epileptic colonies is 12 per cent, against 22 per cent for other state psychiatric institutions. The declining institutional death rate from tuberculosis and other infections is more of a pride to doctors than to taxpayers. I have visited most of the state colonies and have a high regard for the efficiency with which they are run. There should be more than 10 for these 48 states. For most of the patients sent to them, colonies are a haven of refuge from a cruel world; for society, they are an important means of reducing procreation and of providing physical care at a minimum cost. Opinion seems to differ as to whether a colony should be for large scale, custodial care of patients, or whether it should be in fact a hospital. I know that the medical officers of colonies struggle valiantly to keep their institutions hospitals, but may well despair in the face of a rising tide of permanently maimed and seriously deteriorated patients seeking admission. In one colony, the superintendent seems to be unusually successful in shunting the lower grade of cases to mental hospitals, so that the mentality of patients is, I believe, well above the average for colonies, yet funds permit the hiring of only two physicians for the 1200 patients. If modern medicine has nothing to offer to the lower grade members of this group, could they not be taken care of in separate institutions at an even lower cost than the present $1.20 a day? Freed of this burden, colonies could really be hospitals and could throw more support to the productive

part of any program, the care of those mild or incipient cases who stand the best chance of regaining a place in society.

The third and smallest group, numbering probably only a few per cent of the total, are those whose future is and always will be totally hopeless. These are the congenital imbeciles and idiots, the monsters (ugly mistakes of nature, matter in human form without human mind) which by no imaginative possibility can ever be anything better. Money now spent on this group, which is relatively expensive since the members require an unusual amount of nursing care, might better be given to needy members of the first group. And here we, physicians with inherited ethical standards, give way to a biologist and quote Raymond Pearl:[1] "These unfit organisms are kept alive by the rest of society for no realistically demonstrable reason other than that they were once born, and by being born, somehow placed upon the rest of mankind what has gradually come to be regarded as a permanently binding obligation to see that they do not die. It is difficult to convince a biologist that a social philosophy will endure for any great length of time that deliberately and complacently loads upon the already weary backs of the able and fit an evergrowing burden." We at once remind the biologist that, though the physically and mentally unfit are useless, the criminal groups are actually harmful to society and logically should die doubly soon. Yet I see the ghastly incongruity of a society which systematically and cruelly kills its best members by the means called "war," and unmercifully prolongs the lives of its hopeless liabilities. Bullets for the best of humanity; preventive inoculations, trained doctors and nurses for the worst.

In addition to these considerations of responsibility and of hospitalization, concerning which we each have differing opinions, I believe we would all agree that there is need for a changed attitude of society towards epileptics. This altered attitude should originate with physicians, many of whose ideas about epilepsy are long out of date. I quote from the advice given by John of Gaddesden from a book printed in the year our continent was discovered. "Epileptics," says John, "should not mingle with the people to any extent—otherwise this becomes the 'convivial disease' since it occurs at banquets and in crowds on account of the breaths of men which are increased in the brain of the patient, and on account of the

presence of his betters whom he fears and before whom he is ashamed, and by thinking of his condition in their presence, he falls."

The healthy "betters" of the middle and early ages had reason to express disgust, and epileptics had reason to feel degraded, for were they not devil possessed? Now we have no such excuse. Education of physicians and of the public to the view that convulsive seizures are no more shameful than attacks of migraine or of dysmenorrhea, and that the probability of transmission is no greater than that of the transmission of diabetes, is one of the functions of an informed minority, such as we are.

The economist, who has some idea of practicing economy, is never popular. We are glad to turn from sociology to medicine.

Medical Treatment.

The standard means of diagnosis and of treatment are well known to careful and conscientious physicians: careful history-taking; detailed physical and neurological examinations fortified (in special cases) by encephalography; elimination of abnormalities; control of the convulsive manifestations (if they exist) by sedative drugs, or in certain cases, by ketosis or dehydration, and (oftentimes the best rewarded of the doctor's efforts) support of the patient in his effort to maintain his morale and his place in society. What we know is indeed woefully inadequate, but if the above short guide were carried out by general practitioners and so-called "specialists" throughout the country, epileptics would be a much happier and a healthier group of patients.

A considerable proportion of patients look to patent medicine houses for their treatment. Recently I have written to a number of patients who gave testimonials for the principal mail order concern in the United States, and I have visited the physician who is in active charge of this business, an M. D. who graduated near the top of his class in a grade A medical school. This concern is, I believe, in position to offer serious competition to the prescription-writing type of doctor. If these doctors do no more for patients than Dr. James does (ask some questions and give phenobarbital), it is not strange that their services are undersold. Aside from informed conscientious treatment of the patients by the doctor, the

chief cure for quackery is education. Newspaper headline writers must in some way be taught that every report coming from a laboratory is not a "cure." Doctors and patients alike must be kept from reading textbook discussions of epilepsy more than 20 years old. An extended and critical review of the literature should be made periodically. There could be a layman's division of the American League, the members of which would receive annually a nontechnical digest of the review.

Investigation.

Our hope of really helping epileptics lies in the uncovering of new facts and new methods of treatment. What is being done, what should be done, and who will pay the bills? In the past two years, I have visited workers in 25 cities. I cannot here attempt even an outline of work planned or going forward but I believe that never before has there been so widespread an interest in research on the problems of epilepsy. Elsewhere [2] I have set down some of the reasons for believing that epilepsy is a fertile field for research. I shall touch but briefly on some of the main objectives in the search for the causes of epilepsy.

1. The end of research is the eradication of epilepsy from the human race. Evidence is abundant that an inherent though recessive quality, the seizure predisposition, is fundamental. The epileptic is but one of many who possess the predisposition, the gene which may result in paroxysmal cerebral dysrhythmia. In the presence of a given stimulus (birth injury, cerebral infection, trauma) or even without apparent stimulus, the predisposed individual will have seizures; the unpredisposed will not.

There is evidence that genes are chemical substances, perhaps a single large organic molecule. In the end, we must eliminate this molecule or learn to alter its chemical structure. Two roads lead to this goal: First, the breeding out of the abnormal gene; second, its alteration through direct chemical means. The first method will require social human planning and thousands of years of time; the second will require a knowledge of how to alter small chemical units of the body, a knowledge which we do not possess. Tantalizing is the thought that epilepsy could be eliminated from the race by the replacement of, say, a potassium for a sodium ion on a certain

molecule, the total bulk of which molecules for all persons living on the globe is not larger than a mustard seed. However, we are like elephants set to repair a wrist watch; our minds are too small and our hands too huge for successful tinkering with the ultramicroscopic wheels of life. The fact that genes can be altered by exposure to X-ray (even though this has a mutilating effect) gives a shred of hope that some day in some generation a way will be found. For the present, there is some satisfaction in trying to see the final goal, even though, like Moses viewing the Promised Land, we know that we, personally, shall never possess it.

2. Elimination of seizures from individuals. This nearer goal seems not unattainable. It involves alteration not of the chemical molecule which is the gene, but of the gene's abnormal product, the chemico-physical structure of the neurones of the brain. The easily recognized asymmetry of features and of body measurements of epileptics may be matched by invisible asymmetry of the molecules in brain cells. Demonstration that a seizure is a disturbance in the normal rhythm of the electrical activity of the brain permits concentration of attention on those elements which have to do with electrical discharge; namely, the concentration of electrolytes, of oxygen, or of sugar, and the pH of the brain cells, and also the permeability of the cell membranes. The fact that various alterations in body chemistry, such, for example, as simply increasing the CO_2 concentration of respired air, suppresses the abnormal electrical rhythms of epilepsy, indicates the possibility of influencing cell chemistry by clinical means. However, such procedures have not yet revealed the specific abnormality in the neurones of epileptics. Overventilation of the lungs will indeed induce seizures, but only in those patients who are subject to seizures.

The demonstration of the specific chemical abnormality is the most important but most difficult problem before us. The disorder is exactly comparable to disorders of cardiac rhythm, paroxysmal tachycardia, for example. Cardiologists are content to say "irritability of the cardiac pacemaker." But we cannot be content until the process which causes "irritability" is known and controlled. So far, physiological and chemical studies have dealt with body fluids and with organs distant from the brain. We must be able to work with brains of living patients. Advances in surgery make this more feasible than it once was.

Study of Nerve Physiology.

Discovery of the specific something in the physiology of nerve cells which makes them discharge in abnormal rhythm may require many years. We can be greatly heartened by recent enlargements of our knowledge of nerve activity. Already neurophysiologists have demonstrated chemical mediators of nerve impulses, the dependence of electrical discharge of cells on the concentration of certain ions within and without the cell, the influence of ions on the oxygen metabolism of brain cells, the dependence of the principal ion, potassium, on the activity of the adrenal cortex, and the influence of changes of pH, oxygen tension, and sugar on the electrical activity of brain and nerve. These laboratory studies are in close agreement with clinical observations of the last decade, which show, in general, that chemical changes which accelerate the discharge of nervous impulses, also increase the frequency of seizures, and vice versa.

Epileptics are not and never will be simple nerve muscle preparations. The neurones of the brain are connected with and influenced by other portions of the body, especially the nourishing currents of blood, the secretions of glands which are poured into the blood, and perhaps of most importance, the outlying garrisons of the nervous system called "the autonomic nervous system." The chemical mediators have a special clinical significance because of the possibility of neutralizing or counteracting abnormal impulses in the course of their passage from the neurone to the muscle. Even if the evil emissary cannot be prevented from setting out on his journey, perhaps he can be thwarted before he has delivered his message.

Intricate investigations of this type involve the use of special techniques and of especially gifted technicians. The deep problems of epilepsy, as of ills such as cancer and old age, belong to men in laboratories, who are assured of adequate support over a period of years. Our big concern is for men with ideas, and with the energy and the devotion required to put them in execution. The tide of American revolutionary morale turned with the arrival of Lafayette. Just so we embattled epileptologists have reviving courage because of the timely arrival of neurophysiologists like Gibbs and Spiegel.

Indirect Contributions.

Although great and easy victories gained by practitioners of medicine working single-handed are of the past, much of value can yet be learned by keen and honest-minded clinicians. The shining crest of a Mt. Everest can be reached only by an individual extraordinarily endowed by nature but he will reach no such summit unless supported through the various stages of his climb by fellow climbers, technical assistants, and bearers of burdens. The problem of epilepsy offers many opportunities for significant pieces of work which do not require expensive apparatus. However, it requires willingness to do honest and long-continued work, to accumulate sufficient data properly controlled and to integrate and interpret these data in the light of contributions by others.

In our colonies for the care of epileptics, we have collections of human material not to be matched elsewhere. Many valuable contributions have come from some of these colonies. But personnel and funds are limited and while waiting for legislators to realize the money-saving possibilities of medical research, colonies can render a large service to investigation in two ways: first, the resident staff can make large scale test of ideas concerning therapeusis developed in research centers; and second, the management can invite adequately equipped and financed groups from these centers, who will reside in the colony for short periods of time and make studies which the colony itself could not undertake. We workers at Harvard owe much to the hospitality of Dr. Hodskins and his staff at Monson, and also to Dr. Renner, Dr. Marsh, and Dr. Shanahan and the respective colonies over which they preside.

Though investigators equipped with ideas are of first importance, money is also a necessity. I have found only four localities where money has been especially designated for work with epilepsy, Chicago, Baltimore, New Haven and Boston. The total annual amount available is only about $15,000. Income from the largest fund, the $200,000 Minnie Frances Kleman Memorial Fund in Chicago, is for the "assistance of indigent patients suffering with epilepsy," without specifying their locality. The funds at Johns Hopkins and Yale are likewise the income of endowments but limited to those universities. The Harvard Epilepsy Commission has no endowment, only contributions from interested persons.

Most of the research now being conducted comes from foundations and from general research funds of schools and hospitals. I doubt, however, if the whole amount spent on investigation of epilepsy in this country amounts to one-tenth of one per cent of the cost of caring for epileptics. Because of the avowed New Deal policy of liquidating large private fortunes, which have in the past been a principal source of endowments for foundations and schools, medical research, including that for epilepsy, faces a curtailment of activity unless new sources of supply can be found.

In the long run, the people of the United States are the benefactors from medical research and presumably must pay either involuntarily through tax-supported agencies, or voluntarily in multiplied small amounts. Those who are most immediately benefited by research should be the first to give. In order to gauge the reaction of patients to a request for contributions, I have adopted the plan of adding 5 per cent to the bill of each private patient. The following printed notice accompanies the bill:

> In order more effectively to treat diseases such as the one for which you have consulted us, further investigation is essential. With the financial support of interested persons, we are actively carrying on such research. It seems to us that patients who have benefited from previous research or who may benefit from investigations carried on in the future will be glad to contribute to the search for better methods of treatment. We are, therefore, adding 5 per cent to the bill of each of our patients for this purpose. It is understood, however, that payment of this item is entirely voluntary. Do not include it in your check unless you so desire.

In the year in which this practice has been in force, every patient has paid this item without question, and a few have voluntarily increased the amount, so that an average of more than 10 per cent has been received. I believe the principle has received vindication and the practice is worthy of extended adoption by doctors actively engaged in investigation. Then foundations and wealthy persons, while they last, should be shown the need and the opportunity for investigation in this neglected subject of epilepsy. The most permanent of organizations, and the most to gain by reduction in the numbers of epileptics is government itself. Against the present eighteen millions spent by state governments for prolongation of the life of epileptics, only Michigan provides a fund for finding new methods of preventing or of shortening the disease. Public

authorities seem to say, "Millions for maintenance, but not one penny for prevention."

The Need of Coöperation.

I have sketched the raw outlines of some of the aspects of the problem which confronts us; we have a Goliath of a problem and are but a small David going out to meet it.

The Chinese have a proverb:

> Three men with hearts together
> Yellow dirt changes to gold.

The International League Against Epilepsy has been reorganized with branches in five countries. Across the salt water, Dr. Schou, Dr. Muskens and Dr. Fox are trying to stimulate and organize interest. The periodical *Epilepsia* has been revived. We have a comparatively easy task on this big continent. The American Branch now numbers more than 100. Workers in certain centers in America are planning to pool their ideas and to investigate cooperatively certain aspects of the problem. The older, more specialized group, the Section on Convulsive Disorders of The American Psychiatric Association, and the young American League Against Epilepsy, are not competing, but are complementary organizations and should work together at a common task. We are a group huddled over a pile of wooden pieces of various outlines. The problem is to fit these pieces together until they make a picture. Our predecessors from Hippocrates downward have done their part—we add our newly gained knowledge to theirs. Our descendants will match other pieces and eventually the whole problem of epilepsy will be solved.

The immediate objectives of the campaign against epilepsy are:

For society—an awareness of the magnitude of the problem, of the present neglect of incipient cases, and the necessity for research.

For us physicians—a wider diffusion of present knowledge and a harder search for new knowledge, and a will to work together towards a common end, the end of epilepsy.

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PROGNOSIS IN MENTAL DISEASE.*

The Use of One-Page Abstracts.

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Philadelphia.

In the minds of the laity and, unfortunately, in the minds of many of our professional brethren, the prognosis in mental disease is a lugubrious one. They have supposed that anyone "unfortunate enough" to have been a patient in a mental hospital must henceforth be regarded as a semi-invalid and liable at any time to a return to his symptoms. While they have been unable to find a sign over mental hospital gates bearing the inscription, "All ye who enter here leave hope behind," nevertheless they have tacitly assumed that it could well be there. It is our purpose in this paper to examine the truth of these beliefs and to this end five year follow-up studies have been done on over 700 consecutive patients who were admitted to our hospital over a period of two years.

Before beginning this, however, it might be well to quickly scan our previous reports because they have been well preserved. Some of our statistics date back to 1751. From the earliest beginnings of the hospital till the end of 1928, we find that there were 23,146 admissions. Of this number our reports show that 7755 were discharged recovered and 6573 were discharged improved. Upon totalling the two we find that mental patients have not fared so badly after all. We spare you the arithmetic because the paper is to be rather heavily laden with statistics. It is evident, however, that even long before the advent of the newer types of therapy over 25 per cent of our patients were considered—at the time they left the hospital—to be recovered and another 25 per cent improved. We do not know how this number of consecutive admissions compares with the consecutive admissions of general hospitals because statistics of this latter type are singularly absent; however, when we compare our figures with the legends that have come down to us about mental patients we feel that they are much more comforting.

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pennsylvania, June 10-14, 1937.

For all patients, voluntary or committed, who were admitted to the Pennsylvania Hospital during the years 1927 and 1928, abstracts were made out on one side of an ordinary case record page. These abstracts magnified family history, pre-psychotic personality, life events, onset of psychosis and follow-up for five years after admission to the hospital. They minimized the symptoms shown in the hospital unless they threw light upon the earlier life history. As this is entirely a private hospital the families supporting these patients were able to give better than average histories and were easy to reach after the patients went home.

For these one page summaries we are sure there is a use in psychiatry. They allow us to present not statistics but abstracts which show individuals at a glance. It gives a view comparable to that of the low power of the microscope in which some relationships are seen which escape the oil immersion. Here is an illustration:

7433. Mr. S. W. R. Admitted 10-24-27. Dementia præcox—improved.
Father had convulsions to age 13, always sickly; a minister.
Paternal aunt had hysteria and "lots of imagining."
Patient is fifth of six children.
As child healthy, normal, "quickest of all the children."
In dentition very sick: strabismus developed which is now corrected by glasses.
At six to school; bright through high school and normal school.
Pleasant, kind, athletic, modest.
From 21 to 25 taught successfully.
At 25 entered a university: attended all social affairs.
Quiet and bashful, hard to get acquainted with.
Always one or two strong friendships with men.
"No time to bother with girls" or religion.
Clean, particular, exacting and methodical.
At 25 begged rides to Chicago: saw a clerk stealing and rode with a bootlegger.
Both he and companion saw bootlegger give signals and gave themselves up to police for protection.
On return he thought papers were stolen from his room and "broadcast": restless, depressed.
At 26 before admission hallucinated: "I am God." "I am I."
At 27 admitted to hospital: "They scoffed the Inferior." "Truly he was the Creator of all Laws": active and noisy.
Ideas of persecution became stronger.
At 28 discharged unimproved.
At 32 at home, "supporting himself, constantly improving as mother lets him alone. At times he is mildly upset." (From family physician.)

It is easy, when the abstracts can be read at a glance, to put them together in any way which seems profitable. Let us group them in this order:

I. Certain people who seem to have had everything against them from the start.
II. Certain others who seem to have had a very good start in life.
III. Certain people who were tipped over by apparently superficial causes.
IV. Certain others whose troubles, even in these short abstracts, seem to lie in deep instinct difficulties.
V. Cases which present complications and side-lights.

Now let us give you samples of "experiments of nature," knowing that you will not only read between the lines but read in also your own experiences. The one-page abstracts make it easy to group cases by any common factor.

I. We turn first to some people who seem to have been doomed from the start, in whom all of the conditions seem to have been right for the onset of mental disease.

1. Here is a man with a brilliant, alcoholic father; a maternal uncle who was psychotic; a mother who was brilliant, a suffragist, unreliable and emotionally unstable.

The patient dreadfully spoiled, tied close to his mother; was precocious with a tremendous inferiority complex. He always had large plans but he thought that work planned was work done.

Exhilarations came whenever he was given any recognition or whenever life for the next few days seemed hard or monotonous. Spells of despondency, always short, alternated. At 48 he is in a state hospital, never holding to the normal long enough to make it worthwhile to get out.

2. And here is a woman, with much mental disease in the family always delicate, one ear deaf, pitied, pampered and sheltered by relatives, but never allowed to carry out any plan of her own, depressed as a little girl, dependent on an older sister, but dominated by a disorderly emotional mother, her own warm and passionate nature frustrated.

In spite of sister's marriage, mother's death, 20 attacks of depression from 20 to 41, this woman now doing well as a trained nurse.

She was doomed to mental disease, but not to an entirely unhappy life.

3. Now we turn to a boy. Both paternal grandparents were psychotic; father and mother were brilliantly erratic.

He was a fat, croupy, rickety baby; a seclusive small boy, autoerotic, immensely scrupulous; precocious in college; he faced life with a brilliant intellect which carried him through college, but no further; worried about the danger of homosexuals in Europe, to which country he made a sudden trip.

On this trip immoral people signalled to him, noticed that his face was red and knew from this redness that he masturbated; on his return he was catatonic and preoccupied with dreams about a girl cousin, with somatic delusions, desperate anxiety to prove himself manly, which perhaps led to the only suicide among these 116 schizophrenic cases followed over five years.

II. In looking at the opposite of the unhappy early situation we turn toward many patients who got off to a very good start. The stage seemed set for a happy life. The simplest of all the histories will illustrate this.

1. A man of good family history, a steady worker, the secretary of his church, a 32d degree Mason, was happily married at 21, and very proud of his son. At 18 he had had gonorrhea; at 32 there was a urethral discharge which bothered him, and at 42, after a diagnosis of catarrh of the bladder, with reassurance that it was harmless, he began to sit looking for hours at a specimen of urine and saying that he had committed the "unpardonable sin." After a year's depression he recovered to hold a very responsible position for the five years to the present. Out of 47 years he has had one bad one. He was wounded in the heel of Achilles.

2. In another case the outcome was not so good. There was a negative family history; after the patient's illness a married sister became psychotic.

A normal usual childhood; a lovable, self-sacrificing and helpful boy; a good mixer, an athlete; popular; with a good sense of humor; he was president of his club; won the highest honors in his high school class.

At 26 he was shocked by the accidental death of his father; he sat and stared and wept. Gradually he became quiet and preoccupied; complained of his health and of plots against him. Paranoid and somatic delusions persisted, with hallucinations, and ushered in a seclusive and indifferent attitude which has lasted five years. He now goes about unkempt, unshaved, laughing in a silly way to himself.

III. Going one step deeper but still keeping to an apparently superficial level we have:

1. A man who was a very steady worker as a machinist for 14 years. At 35, after great fatigue on overtime work, he sought three escapes—he began to drink, he changed his work, and he became depressed. At 47, after whooping cough, he had another depression. "It's as if a heavy curtain were hung on my head, just as in a theatre, beyond which are beautiful things which I know are there but cannot see."

Or

2. Another man who simply had depressions six times after losses in the stock market; his average attitude being that of a braggart, a restless Lothario.

IV. And then, even in these low power views we get glimpses of deep "instinct troubles."

1. A shy, overmodest, autoerotic boy, interested only in serious things, was dominated completely by his mother (although his sister broke through a similar domination), who conquered his will with a rod. When he broke down at 26 he feared homosexuality and wanted to sleep beside his mother.

2. A kind, determined, athletic homosexual young man who limited his diet to salads and fowl, suddenly broke his engagement. He began to show his mother an affection which was very childish; he slept with her to protect her; voices told him that she was dead, or that she was immoral. At the hospital, he repeated "kiss mama" for hours.

3. A brilliant cheerful boy who became a fine student, a research worker, exceptionally clean and meticulously dressed. While sociable in a crowd, he had no intimate friends, never went in for love making, had his doubts centered upon women and marriage, and was very close to his mother. After some years of delusions he thought that he was hermaphroditic and decided that his refusal to act in sex had spread into all parts of his life.

4. A parallel case is that of a girl who had a strong sex urge, a frank interest in boys, a desire for admiration. She was voted the most popular student in her high school. After being a bridesmaid for her fiance's sister, and having sexual relations with an unknown man, she broke her engagement. She dreamed that her father's head was put in a bucket; she was the illegitimate child of Joseph and Mary; she dreamed that her mother was pressing her abdomen and her father rushed in—he was so closely identified with her that he sensed her pain. She said, "I thought I'd make over a man and I found he was my father." After a "marvelous healing in Christian Science" this woman was readmitted to the hospital.

V. What complications can come into case histories is suggested by the following:

1. A man with psychotic heredity, whose wife was psychotic, had his first attack at 43. He was hypomanic. Five years later he was depressed and brought to the hospital, where his spinal fluid was negative. Recovering from his depression he was discharged, but he returned in eight months with a fully developed Parkinsonism.

2. A man, seclusive and conscientious, married at 19 a wife who was pleasant and uncritical and who kept him in a good social current; even though he was depressed at 39 he kept on at work with his wife's help. At 48 his wife died and at 49 he married a woman who was critical of him and who expected him to fuss about her. The next year she had an operation and the patient went into a depression, at times agitated, at times retarded, which has gone on for five years. This case comes near to showing nature controlling her own experiment.

Diagnosis of the Present 710 Cases.

We have used the Revised Classification of Mental Disorders (Statistical Manual, 1934), and we agree that it is the best classification to be had at present. We have the benefit of the records of staff conferences on each case and also the added advantage of making the diagnosis five years after admission with the opinions of other hospitals and psychiatrists in the follow-up period to guide us. Nevertheless, we are far from satisfied with our diagnoses even after we have built up a large unclassed group. Some cases show more than one psychosis; some seem very definitely placed exactly between two groups. We have done the best we could and when a case seemed to be very close to one group it was included in it. There is nothing we should like better than to have two other psychiatrists divide these cases into groups and then to have the privilege of criticizing their arrangement.

Perhaps it would be well at this time to say a few words about the group which we have labeled "miscellaneous." This includes two epileptics, eight mental deficients, and one traumatic psychosis. We did not follow up this group because we had such a small number of cases and because the work on mental deficients and epileptics has been well done by other investigators. When we consider that only one case of psychosis due to trauma was admitted to our hospital in a period of two years it seems to confirm the prevalent notion that this type of illness is exceedingly rare. Unfortunately our one traumatic case returned to his own country and is lost to us as far as follow-up work is concerned.

Likewise we did not follow alcoholic cases or drug cases who did not have psychoses.

We are not considering the behavior disorders of children at this time. Admissions under this heading totaled 37, most of them following encephalitis. The reason for this apparently large number was the existence of the Franklin School and our findings were the subject of a previous study.[1] However we did follow the cases of adults whom we had diagnosed "psychoses with epidemic encephalitis." They were eight in number and of them we have the following to report:

Recovered	1	Unimproved	2
Improved	1	Died	2
		Lost	2

The one recovery is apparently genuine for we have recently seen the patient and she seems to be in splendid health and is still engaged in teaching school.

In all there were 710 cases admitted in the two years in question, divided as follows:

Manic depressive	171
Dementia præcox	116
Psychosis with somatic disease	60
Senile and arteriosclerosis	50
Involutional melancholia	47
General paresis	38
Alcoholics (without psychosis)	31
Alcoholics (with psychosis)	10
Psychoneuroses	37
Miscellaneous	11
Psychopathic personalities	8
Psychosis with epidemic encephalitis	8
Drug addicts	5
Paranoid conditions	9
Behavior problems (children)	37
Unclassed	72
	710

Manic Depressive.

It will be noted that there were 171 cases diagnosed manic depressive psychosis who were admitted for the first time in the period covered by 1927 and 1928. This constitutes approximately 24 per cent of all admissions and is in marked contrast to some of the reports received from foreign countries, notably Switzerland. In a report from the Burghölzli Anstalt in Switzerland covering a period of one year, we note that there were 11 patients diagnosed manic depressive out of 735 admissions or 1.5 per cent, almost a negligible quantity. Difference in racial characteristics in addition to different diagnostic criteria account for most of this discrepancy.

Our findings show that out of a group of 171 patients the results were as follows:

Recovered	86	Unimproved	30
Improved	19	Died	12
		Suicide	12
	Lost	12	

If we exclude the number of patients who died and those whose whereabouts are unknown, it could be said that 105 were improved after a period of five years and 30 remained either unimproved or suffered a recurrence of their illness. It is also noteworthy that 12 of the 171 patients were known suicides. We have no way of telling how many of those who were reported as having died a natural death, assisted themselves to that end. This confirms the already well known fact of the great suicide risk of depressed patients. The patients marked "recovered" are back in society and leading useful lives. The ultimate prognosis is not within the scope of this paper but suffice it to say that they have been normal and economically valuable for the last five years.

Involutional Melancholia.

There were 47 patients diagnosed as having involutional psychosis. In general the following criteria were demanded before making this diagnosis. First, that the patient be within the involutional period, that this be the first (and only) illness and that they have an agitated depression. We also included under this heading the paranoid types which occurred in the involutional period. The recovery and improvement rate here was perhaps a little higher than we had formerly supposed as is evidenced by the following:

Recovered	12	Unimproved	10
Improved	10	Died	13
		Lost	2

Of the 13 patients who died two were definite suicides, which is striking when we consider that out of 24 deaths in the manic depressive group 12 were suicides. Perhaps this can be partially explained by the fact that when patients have involutional melancholia and come under treatment they are usually continuously protected, whereas in the case of patients with manic depressive depressions, protection is withdrawn at the end of one attack and not resumed soon enough at the beginning of another. It should be kept in mind that our figures in this group encompass a time which antedated the present vigorous treatment with endocrine products. What the results of this latter therapy will show will make an interesting problem in the future.

Dementia Præcox.

The recovery rate in dementia præcox without specific treatment naturally holds unusual interest for us this year because of the attention that the insulin shock therapy is attracting. It should be kept in mind that some investigators now feel that with this new type of treatment, 80 per cent of recent cases can be helped to recovery. Of cases diagnosed dementia præcox * from the vantage point of five years after admission, full recoveries make up only 10 per cent. If to these are added cases which have improved to a considerable extent, the percentage of recovered plus improved cases is 31 per cent. These percentages may be increased if, to the cases diagnosed dementia præcox, there are added those which at one time or another and especially at the time of admission had symptoms which strongly suggested the diagnosis. In the manic depressive group there are 7 of these; in the unclassed group 16; in the paranoid group 5; making a total of 28. Of these 17 recovered, 3 improved, 3 were unimproved, and 3 were lost. By combining these cases of suggested dementia præcox with those which seemed fully to warrant the diagnosis the percentage of full recoveries is 20 per cent, and of recovery and improvement together 40 per cent.

Even stretching matters in this way the recovery rate is far under Dr. Sakel's 80 per cent. However, Dr. Sakel applies his recovery rate to patients who have been ill six months or less at the beginning of the treatment. In our cases of dementia præcox which had only been sick six months or less before admission, 11 per cent recovered. It is 10 per cent or 11 per cent of recoveries with which the results of insulin-shock treatment should be compared. Previous to this type of treatment there was no sustained form of therapy for schizophrenia which produced uniformly good results. In the past five months in our own hospital we have discharged patients as recovered after insulin therapy whom we would for-

* A report of the Burghölzli Hospital (mentioned two paragraphs above) gives the following statistics for 1936: all admissions 990: of which 11 are manic-depressive and 375 are schizophrenic. Diagnostic criteria are so different in Switzerland (and Vienna?) from those in the United States that allowances must be made.

merly have considered hopeless. The following table gives our findings in a five year follow-up study.

Total number of dementia præcox cases			116
Recovered	12	Unimproved	66
Improved	25	Died	10
		Lost	3

General Paresis.

One of the remarkable things about the reports of this group is the paucity of its numbers. It is apparent that the number of patients with paresis admitted to private hospitals was already beginning to dwindle at this time. This lessening has continued steadily and during the last 10 months not one case of paresis has been admitted to our hospital. True enough, on our wards in the city hospital admission of patients of this type are still plentiful. The reasons for the decreased admission of these patients to hospitals like ours are not entirely bound up with a marked drop in the incidence of the disease or even with an increased efficiency in the method of treatment. Some of it is also due to the fact that many general hospitals have taken on the treatment of paretics and as a consequence only the very noisy or unmanageable patients filter through to us.

There were 38 paretics admitted in the years 1927-1928.

Recovered	13	Unimproved	5
Improved	9	Died	12

Grouping them together we could say in a general way that 55.+ per cent improved and 44.+ per cent did not.

Some of the follow-up reports in the cases which recovered are interesting.

R. D., age 46, is reported five years later as follows: "He is better mentally and physically than I have ever known him to be. His wife has given birth to a baby which is perfect in every way."

About another patient, W. E., age 45, it is written:

As to his sickness it is a closed matter at home. He is supporting his children at college without family assistance. He and his wife are extremely successful socially in their town.

Of a third patient, W. W., age 38, his doctor writes:

Patient is in good shape, is working and is in as good condition as I have known him. You can consider him a cure.

Of the 38 cases all but four were treated by malaria: of the four, one was treated by the arsenicals and recovered.

OUTCOME FIVE YEARS AFTER ADMISSION.

	No. of cases.	Re-covered.	Im-proved.	Unim-proved.	Dead.	Lost.
Dementia præcox	116	12	25	66	10	3
Manic depressive	171	86	19	30	24	12
Paresis	38	13	8	5	12	..
Involutional melancholia	47	12	10	10	13	2
Somatic disease	60	22	8	3	23	4
Senile	50	2	4	8	31	5
Alcoholics	10	1	..	3	2	4
Psychoneuroses	37	21	7	4	3	2
Paranoid conditions	9	3	3	2	..	..
Unclassed	72	27	13	11	8	13
Psychopaths	8	..	4	2	1	1
Encephalitics, adult	8	1	1	2	2	2
Total	626	200	102	146	129	48

THE PSYCHONEUROSES.

Certainly 37 are best classified here although we have a prejudice that few uncomplicated psychoneurotics come to an organized mental hospital. Personal recollections are many of patients admitted as "psychoneurotics" who turned out to be schizophrenic. By the five year follow-up many such cases have been eliminated. Some were neurotic reactions to physical diseases and to external causes. The recovered were at work and without the symptoms for which they came.

Recovered	21	Unimproved	41
Improved	7	Died	3
		Lost	2

THE UNCLASSED.

Perhaps enough has been said about our efforts to keep other diagnoses exact by making this group large. Its group of "lost" is

the largest because many patients stayed a day or less in the hospital and no real contacts were made. Some seemed half-way between manic depressive and some other psychosis: in many the influence of some somatic diseases was doubtful. Five years did not clear these diagnoses.

Recovered	27	Unimproved	11
Improved	13	Died	8
Lost	13		

Summary and Conclusions.

Five year follow-up studies for all patients admitted consecutively in 1927 and 1928 to a large private hospital for mental diseases are presented.

Of 710 admissions 84 were inebriates, children with behavior disorders, epileptics or feeble-minded. These 84 are not reported, leaving 626.

For all 626 cases a one-page summary was made to give a picture of life-events.

For 626 consecutive cases the outcome after 5 years was:

Recovery	200	Unimprovement	146
Improvement	102	Death	129
Lost	48		

Deducting the 48 lost cases, of 578 consecutive cases followed, nearly 35 per cent recovered, 18 per cent improved, 25 per cent showed no improvement or retrograded, and 22 per cent died.

Of 116 cases of dementia præcox, 12 recovered and 25 improved to a greater or less extent.

The above figures furnish a base-line by which new therapy can be judged.

The use of one-page abstracts allows easy reference to the salient points of individual cases.

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THE SOCIETY, THE INDIVIDUAL, AND HIS MENTAL DISORDERS.

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Part I.

This paper briefly states the thesis that there is a relation between many of our mental ailments and the social situations which exist in our kind of social system. In proof of this, an examination will be made of the general functions of a society, the individual's place in the social system, and, in particular, certain of the more critical social positions in our own society which, it is argued, contribute to maladjustment. A conceptual scheme which provides a logic for uniting the opposed dichotomous concepts of "the individual" and "the group" will be presented. This last corollary has been appended to the general statement to provide a framework for the collaboration, now almost absent, between the practitioners of the two scientific systems for the study of human behavior, and for the practical application of the findings of the sociologist to psychic therapy.

Ordinarily social behavior is seen from either of two points of view: the first considers the individual as an absolute unit and attempts to discover the meaning of social behavior in separate individuals; and the second sees the behavior of all individuals as a set of relationships bounded in space and time. The continuous interaction of the individuals with each other within the framework of these relationships is a group behavior usually called a society.

A society can be studied from at least two points of view. Certain social anthropologists and modern historians have examined it with the purpose of placing it in a time scale and making certain historical reconstructions. Others have looked at society as though the time aspect were not present and have attempted to see the mechanics of present-day society to determine if generalizations could be drawn to explain the forces which operate in this society. This paper will discuss society from this last approach to human be-

havior, and will look at the group and forget the dimension of time, although, of course, its importance is admitted.

How does the social researcher look at concrete human behavior in such a framework? He must constantly keep in mind who he is as an observer; the "objective" scientist is aware of his own prejudices. With this in mind, human behavior can be observed in three ways: (1) the observer can watch the actions of an individual or individuals; (2) he can record verbalizations; and (3) he can observe the concrete products of social behavior (technological objects). There is little else that he can do by way of collecting concrete facts for later inductions from which generalizations can be made that modern science would accept as valid. Out of this concrete material (physical behavior events and verbalizations collected) certain generalizations can be abstracted which will give us a scientific statement about the kind of group behavior studied.

Group behavior as seen in the present framework possesses a certain fixity in time. That is to say that although change occurs as the generations succeed each other, there is more of the old in the behavior of a given generation than there is of the new. In any given part of the social structure variation will always be found, but in any society which is functioning properly this variation is likely to be at a minimum. For example, in a family structure one sees certain relations between fathers and sons, mothers and sons, husbands and wives, and from these a general statement may be made out of this part of the structure studied which can be tested over generations of time to prove that the various individuals of the society act in this particular group situation with very little variation at a given moment or through the several generations.

Society does three very necessary and useful things. In the first place, no matter how complex the society, a hunting and gathering one at the stone-age level, or a steel and electrical one such as our own, it uses its technology as a means of adjusting itself to its natural environment. The technical behavior of a people relates it to the natural environment so that nature is no longer hostile and the food-gathering behavior is no longer purely that of animals. The technology socially organizes this behavior for man.

There is a second type of human adaptation which relates men together as social individuals. It formalizes relationships and limits the individual variation of each of these relationships. This kind of

adaptation ties human individuals into a general kind of behavior, so that in any given situation they will act in a similar manner. Our social organization not only relates us to each other but helps us to organize our technology to provide a division of labor to handle the various tools by which we change nature to give us our living. Our social organization is also a social mechanism by which we divide the goods we get from nature. If there is a class system such as we possess, the division of labor and of goods is of an unequal kind. On the other hand, if there is a purely democratic society, as are some of the primitive ones, there may be an equal division of goods and of labor among the individuals of the group.

Finally, there is another kind of adaptation which consists of the system, or systems, of beliefs or ideologies and sanctions; in other words, a symbolic level which serves to integrate the other two types of adaptation and integrate the group into a whole. Every society has a symbolic system or symbolic systems, and the symbolic systems of the several societies differ according to the kind of social organization and general behavior found in each group. There is a close relationship between the symbolic system and the organization of the society in which that system is found.

These three adaptive systems not only relate the individual to the total situation in which he must live, but they also exercise control over his actions in the group. The social organization controls his behavior so that he is bound by a set of relations to other individuals in his group. The symbolic system dominates the order of his thinking so that he cannot think outside the symbolic apparatus which the group provides. Variations and changes constantly occur, but the individual still thinks within the general framework of the symbolic system that the society gives him, even though that system may be a changing one. This symbolic system is a part of the general social life in which he participates.

The several types of social adaptation and control limit the variations of these variable individuals and integrate them into a unified group. Nevertheless, there is always a certain individual variation within the group membership. This individual group differentiation can only go to certain limits or the group itself will disintegrate. It is impossible, for example, for it to advance to such an extreme that individuals may have private symbolic systems or private social systems of their own. Only the insane and certain unaccepted artists

and inventors, after our society has exercised extreme sanctions, are allowed such privileges.

The symbolic systems that all societies have are on various levels of abstraction. As social scientists we can observe the physical expression of the social interaction that occurs between two people as they talk to each other while they make certain gestures and sounds. With but little generalization and at only a slightly more general level of abstraction, the relationship of the two individuals is seen as that of husband and wife. The larger group to which these two belong is the limited family. Abstracting still more generally we reach a point where the family is conceptualized not only as a symbol of human social life but as a religious symbol, and it becomes the Holy Family of scripture, and it is fitted into a still larger symbolic system of Christianity, the Cross, and the whole apparatus of our religious ideology. Our symbolic system consists of a series of levels of abstraction, and one must know with what level one is dealing if one is to understand the verbalizations of an informant.

The foregoing statements briefly describe the general kinds of situations found in all groups. Our own society is but one of the thousands found throughout the world which make similar adaptations.

PART II.

One of the great problems of collaboration between the specialists who deal with the sciences of the individual and those of the group is that their fundamental principles are quite different and usually in logical opposition. Whenever the representatives of the two points of view attempt to cooperate on a specific problem, it has always seemed impossible to relate the two conceptual schemes. This difficulty can be avoided by the use of the concepts of the "social personality" and "the individual." The social personality of the individual is the total social participation of that organic item in its particular part of the society. It is thus possible to diagram or chart the social area of the society and the individual's place in it.

A given individual occupies a particular place in the social space of a given society because, of a possible multitude of places he might be in, he participates in this one place, and therefore has a social

personality different from that of any one else, unless another organic individual occupies exactly the same social space which he does.

Let us for the purposes of this exposition simplify our problem and give the social space of our society but two dimensions: a vertical one and a horizontal one. The vertical is a hierarchical order in which people occupy higher and lower positions, and the horizontal represents a social differentiation of behavior at any given vertical level. The rectangle in Chart 1 represents the whole society; lines A_1, A_2, A_3, etc., represent the vertical dimensions of

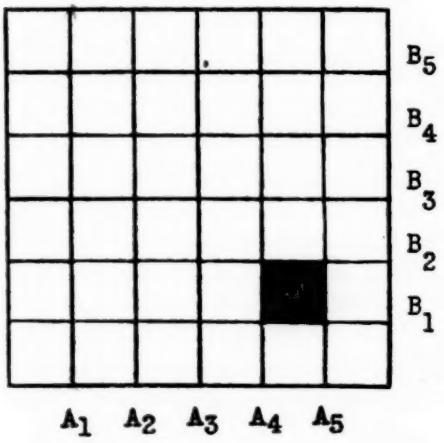


CHART 1.

the total society; and the lines B_1, B_2, B_3, etc., the horizontal. The top of the rectangle is the apex of the social hierarchy. The shaded portion represents the social place (or social personality of an individual) in which a given organic item in the group participates. Other individuals are like a particular individual because they may also participate in approximately the same place in the society that he does. One can say, for example, they are lower middle class persons who are of a certain family and of certain occupational groups.

The operations just described make use of both the individualistic and group points of view. They use the techniques and results of each general science of human behavior and yet do not discard the

leading ideas of either. Such a procedure does not produce two kinds of findings, the one psychological, the other sociological. On the contrary, the inner workings of the individual can be studied with the techniques of the psychologist and the same individual can then be examined within his social place, and his social place can be related to the larger society. More exact comparative analyses of individuals become possible. Individuals with like social personalities and like problems to be solved can be studied separately from individuals who occupy quite different parts of the social structure and who possess different social personalities.

A vital and fundamental question for mental theory and therapy can now be asked. How is an individual (this organic, psychic, social unit) using his part of the society? When we attempt to answer this question, we face the whole problem of mental hygiene, and when we know approximately what the question means, we can better solve the problems of mental therapy. How successfully is the individual utilizing for his purposes the society available to him? We are not asking how he compares with a hypothetical but non-existing normal person in the society, but we are trying to find out how his psychic equilibrium (or his success or failure) compares with other social personalities who by definition occupy similar places in the social system.

Furthermore, the complexity or simplicity of the personality will be determined by the kind of complexity or simplicity that exists in the society in which he lives, and in particular that part of it in which he participates. In other words, in a society such as ours there are certain parts more complex than others, and the personality of the individual will tend to be more complex or more simple according to that part of the society in which the individual participates. It seems important to remember that certain parts are by social function involved in greater conflict than others. Consequently individuals who have a social place in those parts of the social structure will be in greater conflict than those who are in other areas of the society.

The symbolic system of an individual will differ according to the part of the society that he occupies. For example, some of my colleagues and I have made a study of the social system of a county of Western Ireland. There are general class-groups, among them the Ascendancy or Protestant Irish; the Catholic Irish who make up

the vast middle class; and the small group at the bottom, Catholic in name, who must marry within their own group but who are scorned by the others and who are called the Tinkers. The Tinker group is nominally Catholic, but the symbols they use are only in part the symbols used by the rest of the Catholics. Furthermore, the religious symbols of the Protestant Ascendancy are different from those used by the other two. The individual Irishman's symbolic system will depend upon the kind of society in which he lives and that part of the given society which he occupies. This situation is one with which we deal at all times when we interview human beings.

The misuse of the symbols of the social organization can be divided into two general categories: the malfunctioning of the society itself and the faulty orientation of the individual in childhood. A person endowed with a normal physical body, organized so that it functions normally, in all likelihood will function properly in the general social environment. But even though he may have a normal physical endowment, there is still a very good chance that he will not be able to use properly the society in which he has to live, for the reason that either he may not have been oriented successfully to it in his earlier or later development, or parts of the society may not be functioning successfully and this particular person may be unfortunate enough to occupy a part of the society which is functioning badly. It still must be remembered that all parts of the society may be functioning properly but by their very success destroy many of the organic items who occupy particular social places. Durkheim was able to demonstrate that certain kinds of suicide (and mental disorders should be added) were due to the fact that society itself had partly disintegrated—that is to say in the life of an individual that part of the society which he occupied, disintegrated, and the individual who formerly had a satisfactory adjustment to the society could no longer adapt himself, even though he made what had once been the proper responses. Such an individual " feels like a fish out of water " and one course of action for him is suicide. However, suicide might be avoided by a psychosis or a neurosis.

Some of the situations in our society which are unbalanced and possibly disintegrate, and which may contribute to our mental disorders will be summarized:

We have a shifting technology. Our rapidly changing technical system is constantly making people re-form themselves into new groupings and adopt new thinking after they have learned how to live in a certain situation which was dictated in part by the former arrangement of the technology. One only has to observe economic changes which have been taking place in New England with the textile, shoe and other industries leaving, or examine changes in the South where these industries are settling. There is a constant demand on the individuals living in the two areas to make readjustments. Many are not able to do it; others find it extremely difficult. The subtle and varied changes create too great a strain on the psychic life of these individuals. We see in their behavior a disintegrating system to which they strive in vain to adjust themselves. Change continues in our social system, for as our technology shifts and our industrial revolution rapidly increases, the social organization must shift with it.

Our society no longer provides a well-ordered system for us to use. The web, one might say, is frayed and broken and the individual himself must pick and choose, that is, think his way through it. Such thought is related to some of the more characteristic types of mental ailments which we recognize in this society at the present time. As part of our society has been reforming with attendant breaks in the social organization, we have had a decided change in our symbolic systems. The old absolute symbols in which we had complete faith, which dominated us, and which controlled us as absolute ideas beyond which we could not think, have been disintegrating. As a consequence, there has been no place where an individual could say privately or publicly, "This is absolute and certain," without thinking again that after all there are other absolutes, since the people around him may have additional absolute systems which in part will contradict his own. An example of such a conflict of absolutes is the conventional fight between science and the church. The break-up of the one church into many varieties of Protestantism is another. The existence of separate small ideologies or creeds in small groups throughout the country is another. The city of Los Angeles is famous for them. There are thousands of people who come there from everywhere who bring scores of social traditions with them to a place whose social order was disturbed by the early inundations of populations and the social tradi-

tions which these people brought. Most of the inhabitants have no regular order which fits the need of the whole group. The farmers who lived a rural existence in Iowa and prayed to their God for rain to water their crops, and as such once had a workable social system, now find themselves in an urban environment where their old social system and prayers for rain are the antithesis of what their new situation demands. As a consequence we find thousands of little cults, none of which seems to be satisfactorily helping the individual solve his problems in relating himself to the world around him. One need not go as far as Los Angeles to find similar situations. One needs but look around him.

Another interesting phenomenon, very closely connected with this shift in our technology and with the disorder in our symbolic systems is the appearance of a great variety of ethnic traditions which make up the present life of our larger cities and small towns and rural areas. Here again are conflicting social organizations and conflicting symbols, which theoretically might ultimately result in complete breakdown of the society. For the individual the interaction of the several ethnic traditions forms a region of conflict in which he must think and not feel his way. He cannot depend upon his social logics (an ordered thinking and way of action provided by his society) to solve his problems for him. He must select and choose, and to do so at all times may be too heavy a burden on his psychic life. In our society we place a high premium on intelligent choice and action, but despite this we cannot be consciously selective in most of our acts, since to be mentally healthy, our society must provide an ordered way of thinking and acting for us.

Another social situation which has contributed greatly to some of the difficulties that are found in the mental life of many modern individuals is social mobility, that is to say, the going up and the coming down the social ladder in our class hierarchy. Many people move up rapidly, arrive at a certain place, and their upward progress is then stopped by pressure from above them: the individual's frustration often develops into neurosis. Other individuals have never been able to adjust themselves to any particular place in the shifting class world around them, and, as a consequence, they have difficulty in living effectively with other individuals. Personal insecurity because of class mobility is characteristic of American life and has provided at least the beginnings of many mental ailments.

In our southern states we have a caste society, the negro caste being subordinate and the white caste supraordinate. Within each of these castes there is a class situation. These caste and class elements are in conflict. The conflicting sentiments and feelings in the lives of the individuals who must live in that society are in part manifestations of the caste-class conflict.

Many of our social situations are in conflict, and most Europeans and Americans are in situations which make it very difficult for them to adjust themselves. The many stresses in our own social system create individual insecurities in which many people are unable to live adequate healthy existences. Some of them fail and these individuals find their way to the clinics and mental hospitals.

EXOGENOUS REACTION TYPES IN BRUCELLA INFECTION.*

(Undulant Fever.)

By PROF. B. N. SERAFIMOV, Leningrad.

Although the literature on brucellosis has been accumulating for many years comparatively few investigators have concerned themselves with the changes of the nervous system and particularly at its higher levels. However a knowledge of the psychic changes both in the initial stages of the brucella infection and in chronic protracted cases is of interest not only for the psychiatrist and the neurologist, but also for the general practitioner. Brucellosis has long ago left the limits of the hot climates and the corresponding geographical latitudes and it is a well known fact that cases of brucella infection may be encountered everywhere.

In the literature which I have been able to procure the reaction of the peripheral and vegetative nervous systems to brucella infection has been described as including pain in different parts of the body, especially headaches (of a paroxysmal character in the frontal and occipital regions), occasionally in the eye balls, neuralgia, polyneuritis (artalgia, ischialgia, myalgia, radiculitis), lumbo-ischialgia, neuritis of the optic nerve, its atrophy, muscular atrophy, temporary paralysis (paraplegia), paresis, hemiplegia, aphasia, meningismus, meningitis, meningo-encephalitis, encephalo-myelitis, transverse myelitis; more rarely symptoms of increased intra-cranial pressure with focal symptoms distantly resembling those of tumors of the brain, intention tremor, Parkinson's syndrome. Other symptoms are the falling out of the hair, brittleness of the nails, a tendency to perspire, constipation, increased pulse rate without a rise of the temperature, decreased blood pressure, disturbances of the menses, insomnia, increased irritability, general depression; also euphoria when there is no attack (Darkshevich) and sometimes "psychic disturbances of the type of psychoses in the period of convalescence" (Bresancon and Filibert). "It must also be re-

* From the Kasakh Medical Institute. Director V. V. Sikeev.

marked that the causal organism of brucella has been found in the cerebro-spinal fluid" (Roger) in which it has sometimes been possible to find positive Right's reactions. Besides, the cerebro-spinal fluid shows an increased pressure, pleocytosis, an increase of albumen and a decrease of the sugar and the chlorides contents.

With regard to the pathologo-anatomical changes of the vegetative and the central nervous systems in man during brucella infection, Jong considers this disease to be a non-specific, subacute local diffuse meningo-encephalitis with characteristic perivascular infiltration and a degeneration of the ganglia cells. Starker reports degeneration of the ganglia cells of the intervertebral ganglia, minute hæmorrhages in the cerebral cortex with ruptures of the blood vessels, local changes in the nerve fibres. Hansmann and Schenken have observed at a postmorten examination the picture of a chronic meningo-encephalitis with involvement of the vascular walls.

Our material consists of 25 cases of brucella infection, in all of which the reactions of Right and Burnet were positive.

In Table 1 the patients are distributed according to sex, age and duration of the disease.

TABLE 1.

	Age.				Duration of illness.				
Sex.	Up to 10.	20-30.	30-40.	Older than 40.	Up to 1 mo.	1-3 mo.	3-6 mo.	6-12 mo.	1-2 years.
Male	..	4	6	4	5	3	3	1	2
Female ..	1	3	4	3	5	3	2	..	1

TABLE 2.

Occupation of Patients.

	Male.	Female.
Veterinaries	1	..
Zootechnics	3	2
Dairy and cattle-shed workers	4	3
Non-skilled workmen	2	1
Employees	3	3
Collective farm workmen	..	2
Butchery workmen	1	..
Total	14	11

We see from the above tables that the greater number of patients were engaged in work near animals (zootechnics, dairy, cattle-shed and butchery workmen, etc.); it has not been possible to find any differences as regards sex. The greatest number of patients belongs to the young and middle ages. From Table 1 it will be seen that we had patients both in the initial stages of brucella infection and also chronic cases with relapsing clinical syndromes. Those stages were of great interest for the study of the effect of brucellosis upon the nervous system.

As a result of our observations it can be said that brucellosis even before the fever period, before the synovial and the osseo-articular systems are attacked, may produce the following complex of symptoms in the endocrine-vegetative and the central nervous systems: headache, pain in the eye balls, decreased working capacity, disinclination to do work not connected with the patients' professional duties, marked weariness, a peculiar absent-mindedness, irritability, disturbances of sleep, a morbid reaction to high and low temperatures of the air, sometimes hyperacusis and frequent micturition. These symptoms may induce the patient to seek medical assistance and most frequently the physician does not suspect brucellosis; he diagnoses "neurasthenia," "asthenia," "overwork," treats the patients accordingly and sometimes sends them to a sanatorium whence they soon return with the diagnosis "malaria (?)" "typhoid (?)" or "chronic rheumatism," as was the case with some of our patients. This "neurasthenic" period may last from one to several weeks. After that and sometimes without it appears the complex of depressive symptoms: dejection, anguish, constipation. The patients expressed their state in the following terms: "I am in agony"; "it is, as if I had lost something"; "how tiresome"; "I am bored"; "I cannot find a place for myself"; "I am thinking of suicide"; "I have no interest in life." Much more rarely this state is interrupted, as was the case with two of our patients, by motor restlessness with attempts at suicide. It is interesting to note that this depressive background was observed in our patients independently of their age; we had at the same time under observation a mother aged 52 and her daughter of 8 years with absolutely the same complaints of dejection and weariness.

From the point of view of the endocrine-vegetative system more specifically I have been able to observe the following symptoms: a marked increase in muscular excitability, intense contraction of the muscle fibres when tapping the cheek bone (pars orbitalis et palpebralis, m. orbicularis oculi) and a proboscis-like protrusion of the lips; dermography was increased in all cases, but the picture varied greatly from the red aspect to the pylomotor variety; in some cases there was a positive cilio-spinal reflex; rarely Chvostek's sign has been positive. Especially interesting were the results obtained both in protracted and in acute cases of brucellosis during the investigation of Ashner's sign; the latter was observed while pressing upon the eye balls. It appeared that in most cases there was neither an increase nor a decrease of the pulse rate; only rarely was there a change of 2-4 beats, while there were no such responses to other signs, such as Erben or Martinet. This singular "neurotonic" character of a changed Ashner's sign was more constant than the changes of other reflexes of the vegetative nervous system. Such disturbances of that system are probably due to profound changes of humoral and toxic origin.

In the tendon reflexes, we have had more cases of diminished than of exaggerated excitability (in one case there was a complete loss of the knee jerks and the Achilles reflex); changes of the pupillary response were observed only in 2-3 cases of chronic brucellosis, *i. e.*, the pupils were contracted and in one case there was a deformed pupil and the light reflex was abolished. Disturbances of the skin sensibility were found when nerve trunks or their branches were involved in the process. With some patients we could observe hyperacusia, and a singular fear or timidity when they were in a high place; there had been no such symptoms before their illness. The latter phenomena may be explained by changes in the vestibular apparatus under the influence of infection.

Memory disturbances were mostly limited to the processes of reproduction and retention; thus for instance these patients, when shown 5-7 pictures of common objects, could retain in their memory one or two of the pictures. It would be difficult to explain these memory defects as being due only to "post-infection dysthymic asthenia," because positive Right's and Burnet's reactions indicated that the infectious process was still continuing; the same could

be inferred from the fact that treatment of the brucellosis improved the memory of the patients.

To illustrate these conditions a short description of some of our cases is given.

1. Tr-na, V. M., female, age 24, zootechnic; no evidence of hereditary taint; normal growth and development; successful studies at school and at a technical institution; was graduated in 1935 and sent to Kasakhstan for practical work; within the last months she had to work much, was underfed and could not keep to regular meals. Once owing to difficulties with the traffic she had to walk about 10 kilometres; when she came to a farm she drank a glass of unboiled milk and in a few days began to suffer from gradually developing fatigability, general weakness, headaches, pain in the eye balls, weak memory ("I have read a line 10 times and I cannot remember anything"; "when I get up I cannot remember what I must do"). In about a month the patient became very depressed and once even made an attempt at suicide, but it failed because "the string tore"; about this time there was a rise in her temperature, pain appeared in her articulations, especially in the knees and the hip joints; her state became worse, her temperature went up to 39.5° C. sometimes.

This acute period lasted for about four months; the patient all that time was kept at the town hospital of Alma-Ata with the diagnosis "brucellosis." Right's and Burnet's reactions were markedly positive. At the beginning of August the patient was discharged in a good state and went back to her work.

On August 28 the patient was directed to me for a consultation. She complained of periodical insomnia, bad appetite, irritability, frequent crying, dejection, an increased sensibility to ordinary acustic stimuli, fear of being in high places, frequent feeling of being cold, a change of the menses (longer duration 3-5 days), weak memory; the latter the patient noticed when reading papers or books: "I read much, but if you ask me in half an hour, I cannot remember anything"; "my memory is like a sieve, it does not retain anything." When shown five objects, she could remember only two. In her disposition there predominated general dejection and weariness, but there were no thoughts of suicide; besides, there was a tendency to shun other people's society and the patient considered her life to be a useless burden. No other psychic deficiencies could be observed.

Physical examination: asthenic build with deficient nutrition; hypomimia; slight asymmetry in the innervation of the right facial nerve; decreased blood pressure (100/60); red, stable dermography, increased mechanical muscular excitability, contraction of the m. orbicularis oculi when either cheek bone is tapped, Ashner's sign 64-60-64, Martinet's formula 70/64. There was an increased tendency to perspire, a dryness of the tongue, tremor of the outstretched fingers, tongue and closed eye lids, equally dilated pupils with vivid reaction to light and convergence, low knee jerks; the reflexes of the mucous membranes were normal; so was the skin sensibility. The heart was dilated to the left, its beats were dull; there was slight flatulency; percussion of the

spleen showed its upper limit to be at the eighth rib; the region of the liver was tender. Active and passive flexion of the left hip joint and knee was rather painful. Right's and Burnet's reactions were positive.

In this case it is interesting to note that the beginning of the illness was connected with the consumption of unboiled milk at a time of exhaustion and tiredness; it is also interesting that of the group of people who had been with her and had also taken the same milk only our patient Tr-na caught the infection of brucellosis; this circumstance makes it probable that there exists a certain individual predisposition for brucellosis. In our patient at the beginning of the illness a neurasthenic period was observed which was followed by depression with an attempt at suicide; it has been ascertained that our patient did not belong to the type of "depressive psychopaths" as described by Schneider and had never before evidenced symptoms of constitutional depression. Thus we may draw the conclusion that in this patient there developed an exogenous reaction which may be classified among the exogenous reaction types of Bonhoeffer.

2. Ro-ov, male, age 52, Russian, born in Kasakhstan, medical dresser, married; heredity taints: father alcoholic and stammerer; patient also stammers since childhood; several relatives have died of cancer. Patient was lively and active as a child and was easily agitated; his school work was satisfactory, but he was hampered by his stammering. After school he entered the medical dressers classes and then did his military service; he took part in the World War and the civil war; has had typhoid, paratyphoid and malaria. During the last years has been working in the country as a dresser, worked very hard, had to drive about his district very often, could not keep to regular meals, often drank unboiled milk, though warned by the veterinary surgeon that the cattle of the district were infected with brucellosis.

The patient describes in the following way the beginning of his illness. At the beginning of April, 1936, he began to suffer from headaches, progressing fatigability, general weakness, irritability, a weakening of the memory, pain in the spine, pain in the articulations especially in the lower extremities; the temperature began to rise irregularly, there was constipation, accompanied by a disagreeable sensation in the region of the epigastrium; there appeared a tenderness in the regions of the liver and spleen.

The patient was sent from his district infirmary to the city hospital at Alma-Ata where Right's and Burnet's reactions gave positive responses. At the beginning of October the patient's physical state improved considerably: the temperature fell, the pain in the joints decreased considerably, the bowels moved more regularly, but in his psychic sphere there appeared a depression: dejection, thoughts of suicide, a marked weakening of the memory, insomnia, dryness of the mouth.

On October 11 the patient was examined by me at the clinical therapeutical department of the town hospital of Alma-Ata. Somatic findings: athletic build, nutrition markedly impaired; spleen and liver somewhat enlarged but not tender; epididymitis; in the lungs some dry and wet râles. The limits of heart were extended, its beats dull; the pulse 90, labile; there was a slight cyanotic tint of the lips; Ashner's sign 76-76-80; Martinet's sign —90/76; blood pressure 90/50; an increased mechanical muscular excitability; contraction of the m. orbicularis oculi when the cheek bones were tapped; red dermography with a white reactive stripe; a dry tongue; tremor of the fingers and the upper lids; lively tendon reflexes; the pupils were irregular in shape and reacted insufficiently to light; otherwise their reactions were normal; there was frequent micturition; the patient stammered. Psychical status: depression but with no symptoms of an inhibitive state; the patient was sullen and dejected, spoke of suicide, but did not accuse himself of anything, *e. g.*, "everything is horrid, it is better to die"; "I ought to take several powders at once and everything would be finished." There was a tendency to remain alone; the memory was considerably impaired; thus of six objects that were shown he remembered only three; his sense of hearing was intensified; all these symptoms became worse towards evening. I have not been able to observe any other irregularities in the patient's psychical status. This is another case in which a depressive state developed in a brucella patient.

3. S. G-ov, male, age 32, Russian, born in Baku, single, employee. Family history: his father died of apoplexy; he had suffered from phobias and fixed ideas, used to drink; his mother was "sly" and died of a disease of the heart; there were 12 children, the majority of whom had died in infancy; our patient was the ninth child; he had great difficulties in his childhood, was not taught to read and write; from his 11th year he began to work, at first helping porters and then the peasants. In 1919 he enlisted in the Red Army as a volunteer where he learned how to read and write; in 1930 he entered a technical school which however he did not finish and was sent to work to Kasakhstan where he spent three and one-half years. He had never suffered from marked changes in his temper. During that period he had had typhoid, malaria and nephritis. In 1935 in the region where he worked there began a disease of the cattle and pigs; our patient took part in coping with that disease, but did not take care of himself; he drank unboiled milk and often used to eat sheep's cheese. In December, 1935, after having been ill with tonsillitis he began to suffer from fatigue, lack of self confidence, irritability, headaches, weak memory, restlessness at night. That state lasted about two months and then together with increased irritability, irascibility and marked fatigability there appeared a pain in his bones, in the calves of his legs and in his right knee, while his temperature more rarely rose to 38° C. What greatly upset the patient and caused him to seek medical assistance, was a marked weakening of the memory concerning current events, which had led to several disagreeable conflicts in the service. His physician having suspected brucellosis sent him to the hospital for the purpose of having the specific reactions performed (Right, Burnet) which gave positive responses. On Octo-

ber 8 the patient was directed to me for a consultation. Somatic status: asthenic build, medium nutrition, lungs normal, heart slightly dilated to the left with dull beats, pulse 78, labile, Ashner's sign 74-72-72, Martinet's sign 78-74, pupils normal, marked red dermography, increased mechanical muscular excitability, contraction of the m. orbicularis oculi when the cheek bones were tapped; decreased tendon reflexes; tenderness of the legs when pressed; liver not enlarged and not painful; spleen enlarged but not tender; frequent micturition. Psychic state: low spirited but no stupor; thoughts of suicide but none of self accusation or self abasement; complaints of a depressive incomprehensible anguish, heaviness in the head and insomnia; that depression arises "out of the depths" of the patient, is "incomprehensible," and "is in no way connected with the patient's surroundings." The morbid state was very stable and generally became worse towards evening. Besides there were disturbances of the patient's memory concerning the latest and current events; however there were no false reminiscences and no tendency to confabulation. Of seven objects which were produced the patient could remember only three. It was interesting to note that the patient's sense of hearing was more acute; he himself considered that to be due to his morbid state. There were no other pathological changes in his psychical state. This is undoubtedly a depressive state in a patient with brucellosis.

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THE CARE OF EXTRAMURAL PATIENTS WITH MAJOR CONVULSIONS.*

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In the management of patients with convulsions in an out-patient department the classification is very simple. In those cases in which the cause is known the patient is designated by the cause, namely, a case of syphilis with convulsions, a case of brain tumor with convulsions, while the remainder are grouped as cases with convulsions in whom the cause is not known. The former, with known etiology, can be referred as soon as classified to the appropriate department for treatment, while the latter become the property of the neuropsychiatric section until more exhaustive study indicates need for further consultation, or by proper handling the case ceases to be a problem. The study presented here concerns only those cases initially classified as having convulsions of unknown etiology and referred to the neuropsychiatric clinic as such.

The value of the study is that the close follow-up allows an estimation to be made of the different methods of managing such patients who are often considered hopeless or in need of institutional care.

Since 1929 at the University Hospital at the University of Virginia a determined effort has been made to keep in contact with the patients suffering from convulsive seizures. By means of repeated returns to the out-patient department and by follow-up letters at stated intervals the career of each individual has been followed in so far as it was possible. The experiences of this group were reported in 1932 and again in 1934, when the effect of different forms of therapy was considered. Patients with convulsions of a recurrent and chronic nature who have entered this hospital for the first time over that period, average in number 50 a year, making a gross number of 350 patients. Of these, all of which

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are worthy of the diagnosis of "epilepsy," 231 have been followed in some form. As it is felt that no estimate can be made of any form of therapy which has not been in existence for at least a year, only 126 cases are considered proper for this report. We report here, therefore, 126 patients from the wards and out-patient department of a general hospital that have been followed in the neuropsychiatric clinic from one to five years.

The object of therapy throughout has been to use every known method of diagnosis and treatment in order to maintain the patient in the community so as to enable him as near as possible to live a useful and happy life. The attitude has been assumed that the convulsion was always a matter of the whole personality and that any form of success in therapy must depend on noting carefully the effect of the patient on the environment and the reaction of

TABLE 1.

Number followed	231
Number adequately followed	126
Number died	13
Number living in institutions	16
Number living in community	97
Number improved	73
Number unimproved	24

the environment on him. Diagnosis is always important, but it was felt that in a great number of persons the cause would never be known and if known, could never be removed, so that adjustment to a life with convulsions was imperative, and should be the object of therapy.

Up until the spring of 1935, 13 of the 126 patients had died; 16 had been forced into institutions. Of the 16, four are now diagnosed "dementia præcox" and two of these, since their psychosis has developed, have had no convulsions. Ninety-seven of the group are at large in the community, the majority in their own homes with their families. Seventy-three of the 97 are able to carry on their lives and to take a place of some value in the lives of others, while 24 are so handicapped that they are a burden and cause special situation adjustments. Seventy-three adjusted epileptics are very few it is true, yet the study of why they are adjusted gives a panorama of the therapy of major convulsive disorders.

Two cases were relieved by surgical removal of neoplasms. A small number, yet one which indicates the value of surgical intervention in relation to the whole field of epilepsy. Extirpation of convolutions and removal of tumors are worthy contributions, but are overemphasized perhaps by their spectacular nature when the whole field of convulsive disorders is considered. Three cases of major convulsions responded to psychotherapy; one case had extensive analysis, while the other two responded to the management of intolerable domestic situations. Here the relative importance of pure psychogenic major convulsions is illustrated. Perhaps we should expect four per cent (4%) of all seizures to be psychogenic. Three cases have been well since encephalography. Two of these showed a normal encephalogram and one an arachnoiditis. In five

TABLE 2.

CAUSE OF IMPROVEMENT.

1. Surgical intervension	2
2. Psychotherapy	3
3. Calcium	8
4. Glandular	5
5. Encephalography	3
6. Frequent feedings	5
7. Time—"Outgrew spells"	4
8. Phenobarbital	43

cases hypoglycemia has been thought to be a factor. Our experience with this condition has been very interesting. Five-hour glucose tolerance tests have been conducted on all cases in which the history made hypoglycemia a possible cause and frequently the blood-sugar findings have been low at one period during the test, but in no case have we been able to produce a convulsion, or more in than a few of the patients, premonitory symptoms. Prolonged starvation has been tried with like results. Certainly, frequent feedings have helped some patients, but we cannot help but feel that hypoglycemia as a cause of major convulsions is rare.

Two cases of pyknolepsy have improved with puberty, while two other cases, both males, have presented an interesting picture. Both were in late adolescence when first observed. They were intellectually well developed, but emotionally greatly retarded. They were hyperactive and very unstable, but as the years have gone on

they have rapidly matured and as their emotional age has reached their chronological level the convulsions have ceased. Perhaps this is another type of pyknolepsy.

The remaining 43 cases are now on phenobarbital. An effort is made to adjust this drug to their individual needs. It is found that according to the strains they undergo, as well as their convulsive tendency, this drug can be varied with very satisfactory results. Dehydration is used only in combination with phenobarbital. Our experience with the dehydration regimen of Fay has been disappointing. The main difficulty is the poor cooperation of the patient when not under constant supervision. Yet, even in those cases where the total fluid intake was kept in the neighborhood of 400 cc. during an extensive period, spells would still occur until it was felt that the procedure was not worth the suffering it caused nor the difficulties arising from the program. On the other hand, in those cases which showed signs of impairment of the spinal fluid pathways in the encephalogram—either the so-called cortical atrophy or archnoiditis—the restriction of fluid intake to less than 1000 cc. daily seems to have allowed the use of smaller amounts of phenobarbital. The experience with the ketogenic diet has been very similar. This procedure is still used in the treatment of all children and most of the young adults who have convulsions of unknown origin. Each time the regimen had been continued for five to six months, then has failed to help or, at least, to help sufficiently to make it worth while to continue the high fat schedule, so the diet has been dropped and the patient with great rejoicing has returned to phenobarbital and carbohydrates. The ketogenic diet is easier to control than dehydration because of the urinary check and because it is not so hard on the patient; yet, in many cases, the condition of ketosis seems to have had very little effect on the number or severity of the spells.

Seventy-six cases had encephalograms. Twenty-six showed cortical atrophy; ten showed arachnoiditis; five showed arachnoiditis with ventricular enlargement and five showed distortion of the ventricles. In other words, 46 out of 76 showed some abnormality of the spinal fluid pathway, while 30 air injections gave a normal picture. It is still felt that the encephalogram is a necessary part of a complete study when no definite cause is found without its use. This form of study helps in prognosis and is of aid in therapy, as

has been mentioned above. Yet, it is felt that here again we are using a technique that we may later discard. The value obtained from the study may be considered hardly worth the trouble and suffering caused by the procedure. If all neurological studies are negative and there are no focal symptoms during the attack, it is rare that the encephalogram adds any vital information.

Bromide when combined with regular estimation of the concentration of the drug in the blood serum has proved fairly satisfactory, but as a rule it causes an uncomfortable drowsiness and sluggishness not found when phenobarbital is employed properly. At the present time the former drug is used only when the latter fails and then usually in conjunction with it. Bromide is of more value in the control of minor attacks so it is used when petit mal is present.

The most important consideration, after all, in the care of extramural persons with this affliction, has been the handling of the environment. Since we admitted from the first that our objective was not cure necessarily, but the optimum adjustment of a patient with convulsions, each case has been a social problem from the start. A great deal of our success has arisen from the fact that our community is a rural one, as certainly the complexity and mechanization of urban life increases the difficulty of life and above all the obtaining of employment. Mill work or factory work especially where compensation laws exist are very difficult places for patients with convulsions to remain employed. Indeed, the only successes we have had have been with patients so valuable that their handicaps were overlooked. Positions for road work and general labor can usually be obtained and maintained if special efforts are made to explain the situation to the direct employer. Here again the difficulty is the compensation law, but individual attention can often solve such problems.

The maintenance of children with convulsions in the schools is also hard to manage and in most instances special tutors or teaching at home is necessary, although it is surprising how much a sympathetic principal can do to control the attitude of the teachers and pupils toward the patient. Certainly a normal life in a normal environment should be the ideal and through investigation and effort a great deal can be done toward this objective. This ideal is important because extramural patients show less deterioration

than those in institutions. This is what one would expect as there is nothing characteristic about epileptic deterioration, depending as it does, on the individual's ability to meet his situation, just as it does in any other personality disorder and varying as it does, according to the type of personality involved. Therefore, the maintenance of a normal home life, normal employment and recreation is of greatest importance. The care of the extramural case then must invade the home, must call for constant contact and a mutual understanding very similar to that of the physician in the institution, but with the difference that the patient is in competition with normal individuals, so needs greater help. The socialization—the adjustment in the community—is the largest part of the extramural care.

To *summarize* then the deductions arrived at from following a group of persons living in a community while suffering from convulsive disorders have been presented and the value of different forms of therapy discussed. There are still many problems to be solved, but certainly when the convulsion is considered as a reaction of the individual in whole or in part, thus allowing one to bring every form of influence to bear on the amelioration of the problem, the study is more interesting and the outlook more optimistic. This study shows that in this group of persons commonly known as "ideopathic epileptics," but here designated as individuals with *convulsions of unknown origin*, much can be done. A large percentage have been able to live useful lives in the community. Some have apparently been cured, while others have outgrown their attacks. Also, although diligently employed, the ketogenic diet and the dehydration program have failed to be of lasting value, while disturbed carbohydrate metabolism has rarely been demonstrated and has never been proved to be a cause of convulsions. Finally, the proper management of the phenobarbital dosage and above all, the proper social adjustment of the patient has offered more than other forms of treatment.

DISCUSSION.

DR. WILLIAM L. NELSON (St. Louis, Mo.).—We here in St. Louis who have been working more definitely with special problems in behavior probably have had a little more favorable experience than Dr. Wilson in getting an acceptance of these individuals by our boards of education and their lodgment in the regular schools. I would like, if I may, to differ from Dr. Wilson as to

the advisability of training individuals of this sort by private tutorage. Thinking of personality as a reality interchange between the individual and his environment, I can't conceive of a narrow training of the epileptic in terms of vocational preparation under the type of training that is involved in tutorage; we need competition and coordinated and cooperative activity for him. Therefore, it is our task, I think, to persuade schools to accept these individuals, except during the time of a seizure. It is rather an easy thing for us here to get children accepted in the regular classes, and it is surprising what one can do in the schoolroom with both teacher and pupils in terms of their sympathetic response to a child with convulsions. I have seen a few of them in our schools and have seen the reaction of some of the pupils, and the pupils' reaction depends largely on the conditioning they get from their teacher; the school teacher, therefore, has her opportunity also in the general plan of care of children suffering from epilepsy.

DR. G. KIRBY COLLIER (Rochester, N. Y.).—It is very pleasing indeed to hear the optimistic note from Dr Wilson. Some years ago when this Section was first established, it was felt that it was wise to do away with the word "epilepsy." If there is any one word in the English language which spells horror to the layman, it is the word epilepsy. Personally, I make it a point when a patient is referred to me, whether it is an adult or a child, that the word "epilepsy" shall not be used at any time in discussing the symptom picture with the patient or in the family group. I think we all recognize so-called epilepsy, convulsive disease, as I like to call it at the moment, as a many-faceted disease; and if we are going to accomplish anything at all, it is only by a study of the whole personality as well as the environment in which the patient lives.

I hardly think it is wise to go into the medicinal therapy, but if we would pay a little less attention to the one symptom of convulsive disease, the convulsive attack, we would get along much better with our patients. We should study the individual as a whole, instead of merely considering and keeping a complete record of these attacks; that is important of course, but the whole life picture of the patient is far more important than any record of the individual attacks.

The last speaker referred to the school child. I fully agree with him that the place for the so-called convulsive child, with only the occasional symptom, is in the school. I have been associated with one of our large school systems for a number of years and it has always been my procedure to keep these children in school by the aid of a teacher, the home room teacher and all of those having contact with the so-called epileptic child, having the visiting teacher look into the home situation as often as possible and the child being seen in clinic as often as possible. A great many of these children can be kept in school and an adjustment brought about.

I fully agree with Dr. Wilson in what he has to say regarding the ketogenic diet. Personally, I have seen no results in the use of the ketogenic diet. I have seen results, however, in dehydration. I feel that we shall see better

results as we understand dehydration better. I think that we are forcing dehydration too far, and as we go into the chemistry more and more, we are striking a happy medium and finding a dehydration level which is followed by considerable improvement.

Dr. William N. Hughes (Providence, R. I.).—I should like to refer to the petit mal type of seizure in children. I received a great deal of help in the last few months from Dr. Wm. Lennox of Boston in distinguishing between the so-called hysterical type of petit mal and the organic type. He has done electro-encephalograms on certain borderline cases by means of which definite diagnoses have been made. I disagree as heartily as I can with Dr. Wilson in regard to the use of the ketogenic diet. I have got extremely good results with the ketogenic diet. In children under 15, with 25 or 30 seizures a day, when they are put on a carefully weighed ketogenic diet and follow it, the seizures unquestionably diminish, sometimes to none a day and at most to one or two or three. If these cases are treated before they are 15, Dr. Lennox hopes, and I hope, that the freedom from epileptic attacks may carry over into adult life.

In treating certain of these children with the ketogenic diet, children with pale, pasty faces, perhaps with a few pimples, very often develop red cheeks and the temper improves to a great extent. That is one of the remarkable things in regard to the diet. You give a child a high fat diet which is a very difficult diet to take and if you add to it adequate calcium, the complexion usually improves greatly, and the girls appreciate that a great deal.

Dr. T. B. Bass (Abilene, Texas).—Mr. Chairman, the treatment of epilepsy is largely an individual business based on the personality of each patient. The ketogenic diet, I have found, has been extremely difficult to carry out. It is hard to get the patient or their families to carry it out.

I should like to report one unusual case of dehydration. This patient was a druggist, a nervous kind of a fellow who occasionally had spells, but not very many. When he would wait on a customer, he would go back and take a drink of water. He soon developed the habit of drinking water every few minutes, he drank lots of water. His fits increased and his condition became such that he couldn't attend to business and he was sent to our institution. We noticed his desire for water, and we shut the water off and put him on dehydration. After a year, we were able to control his drinking water and his convulsions almost ceased. Now he has been out for about a year. He doesn't drink water except when absolutely necessary and he gets along pretty well and has very few attacks.

Dr. David C. Wilson (University, Va.).—I don't believe that special tutors are a good idea, as Dr. Nelson seemed to think. Certainly we have had a great deal of difficulty in keeping convulsive children in the schools. With regard to bromide and phenobarbital, the great point is to study your individual case; you have to follow them very carefully and you have to have a

rather intelligent mother or intelligent person who will help you in the control of your drug. I think this giving of blanket drugs and letting the person take three grains a day or six grains a day and letting it go at that is improper.

I was very glad to hear Dr. Hughes speak of the ketogenic diet. I am sure there are others here that have used it and have had success also. I understand that they were private institutional cases, that he had such good results with and not clinic patients.

I am quite disappointed that no one took up the glycosuria point of view.

One thing we have noticed with cases in which we have followed the five-hour curve; it sometimes drops to 45 or 50, and yet you won't have symptoms.

We feel that perhaps it is a sudden drop in the glucose in the blood that is the factor, but this is a matter for further observation.

A REVIEW OF ONE HUNDRED AND FORTY-FOUR CASES OF AFFECTIVE DISORDERS—AFTER SEVEN YEARS.*

By LESLIE B. HOHMAN, Baltimore, Md.,
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At a time when psychiatry is so occupied with disputes about methods of psychotherapy it seemed that it might be valuable to look at psychiatric material from the objective point of view of symptomatology, course and outcome. It is important to know what disease will do of its own accord. I wonder if the review of cases after decently long periods of time would not bring many surprises to everybody—both as prognosticators and therapeutists.

From the time of my introduction to psychiatry in 1914 it seemed to me that the Kraepelinian doctrines have kept an almost strangle hold on psychiatric thinking. Either we have followed slavishly the manic-depressive doctrine and forcibly distorted cases to fit the mold; or, we have rejected the manic-depressive concept and have been tempted to throw overboard all of the virtue of the idea of symptomatology, course and outcome. With the rejection we have reached for (a) *complete* psychogenic or (b) brain disease explanation.

To try to test the wisdom of these conflicting positions, I decided to study a group of cases which I had seen in my private practice in the year of 1929. I selected 144 cases which represented all the cases of *affective psychoses* † which I had seen in that year. These cases for the most part were referred to me by prominent internists

* Read at the twenty-fourth anniversary of the Henry Phipps Psychiatric Clinic, April 16, 1937.

† By affective psychosis I mean a mental illness which, generally speaking, is characterized by a pervasive mood (usually depression or elation or a mixture of the two; but the pervasive mood can be fear or anxiety or bewilderment or anger); with a tendency to loss or increase of interest, slowness or speed in thinking and talking, disturbance in appetites and sleep, diurnal variation in symptoms; a tendency to develop somatic complaints, and ideas of self-depreciation and accusation or self-elevation. I do not distinguish between neurotic and psychotic affective disorders except quantitatively. Qualitatively I do not accept the distinction.

who were conducting intensive diagnostic studies on these patients. My psychiatric opinions formed a part of this general medical survey. The series is essentially an extramural group of patients and involves a type of case which does not therefore ordinarily come into the hands of the psychiatrist. The series probably includes more physical illness than a similar group selected from a mental hospital service. There were more males than females (86 males, 58 females), but this is due to the fact that there are in Baltimore women psychiatric consultants who are more likely to be asked to see our women patients.

I selected the year 1929 because it antedated the financial depression and because it gave a seven-year period for the follow-up.*

In my written opinions in this series of cases I gave diagnoses which were essentially descriptive—expressing whether (1) I thought the mood disturbance predominated in the picture of the illness; (2) the main presenting symptomatology was—hypochondriasis, fear, panicky states, anxiety, delusional or hallucinatory material, invalidism, agitation, puzzling, confusion, unreality feelings, paranoid attitudes, etc.; (3) organic brain damage in the form of memory or judgment impairment, or focal brain disease signs were present. The diagnostic description usually included some etiological opinion such as "reactive to psychologic causes"; "constitutional," or "secondary to physical disease." I also gave a prognostication—good, guardedly good or guardedly poor, and poor.

The factors which made me give a guarded prognosis were in part as follows:

1. Evidence that the affective component might be less pervading than it seemed. One therefore had to weight the prognosis on the possibility that depression was only accompanying a chronic psychoneurotic or invalidism state.
2. Prolongation of illness beyond three years.
3. The presence of organic brain disease.

* A letter was sent to each patient asking if he had recovered from the nervous illness which he had in 1929; if he had recovered had he had any recurrence of the illness?, and each patient was given the opportunity for a longer comment if he chose.

Each patient was sent registered mail if he failed to answer the first two letters of inquiry. Of the 144 cases we have had responses from 122. (We have some information on a few of the patients who did not respond.)

4. The age of the patient. Cases beyond 60 were thought to have less good outlook.

5. The presence of paranoid features.*

6. The presence of distorted hypochondriasis.

7. The tendency to alternate between elation and depression without intermissions of normality.

This type of descriptive diagnosis involves the making of many quasi-diagnostic categories, many of which I am now prepared to abandon after studying this material. After this review, I feel that we can make only this statement; where mood disturbance is prominent and pervasive, patients tend to recover irrespective of other symptomatology, including brain disease, duration of illness, precipitating cause or age. To my surprise I found that the factors enumerated as making the prognosis doubtful are much less decisive or critical than I would have suspected. For example, when one reexamines the records of the cases over 60 years of age one finds the following facts; of 21 cases 5 must be excluded (2 are without follow-up information and 3 died surgical deaths within a few months); of the 16 available cases—10 recovered completely, 2 improved markedly, and 4 failed to recover. Now one-half of the cases showed memory defects which were equally distributed between recovery and non-recovery.

As to duration of illness the following facts are available. Of 122 cases we have 85 cases of recovery (22 of the series are excluded because of no follow-ups). The durations of the illnesses ranged from 3 months to 11 years. 33 of the 85 recovered within one year; 23 of the 85 within 2 years; 10 of the 85 recovered in the 3d year; 5 in the 5th, 4 in the 6th, and 3 in the 7th and one each in the 8th, 9th, 10th and 11th years. The number of recoveries after 3 years (19 out of 85) was to me very striking.

It appears to me from the study of this group of cases that the tendency to run a self-limited course is strongest in the absence of the factors which I have enumerated above as leading to guarding of prognosis. For example, in 82 cases when I predicted recovery without question, 69 of the cases recovered completely and only

* Obviously other schizophrenic features would be regarded as having unfavorable prognostic significance but the series did not include any cases with schizophrenic admixtures.

7 failed to recover (6 cases must be eliminated because of death, suicide or development of profound brain changes). On the other hand in the group of 40 cases in which the prognosis was guarded, 13 recovered, 6 improved and 18 failed to recover (2 excluded because of suicide). Thus one can say that in cases with clear-cut affect nine-tenths recovered; where there were untoward signs less than one-half recovered. In reviewing the cases that failed to recover no single type of untoward sign or symptom seems to have operated critically. Patients recovered, and did not recover, with and without:—cerebral arteriosclerosis, continuously alternating elation and depression, continuing situational difficulties, with advanced age, with background of suspected chronic psychoneurotic or chronic invalidism, and with paranoid attitudes.

I was further impressed with the fact that of the 133 cases of affective disorders there were only 11 cases which had, or had had elation as part of the illness. This confirms an opinion which I have long held that the concept of manic-depressive insanity cannot be reconciled with the overwhelming preponderance of depressive cases. If only one-thirteenth of the cases had elation at any time, I cannot believe that we are looking at the same illness in all affective disorders—even discounting the fact that mild elation would tend to escape medical supervision. Of course elation of severer degree does require prompt hospitalization.

As against my experience, in a report to Dr. Adolf Meyer by the statistician of the New York State Hospital Commission for the ten-year period between 1910 to 1919, there were reported over 8000 cases of manic-depressive admissions and 67 per cent of them were tabulated as manic, mixed, or circular, and only 33 per cent depressive.

It is difficult for me to reconcile this discrepancy unless it be that manic excitements almost invariably require hospitalization and commitment. I say commitment also because my original impression of the large preponderance of depressions over elations was gained from the material seen at the Phipps Psychiatric Clinic, a hospital which does not accept committed cases. I made a further check, through the staff of the Sheppard & Enoch Pratt Hospital, a private hospital, which receives commitments, and their material shows a great preponderance of depressions over elations—their guess being 4 or 5 to 1.

Although the number of cases is too small to make any definite statement it is my impression that a significant part of alternating cases without intermissions of normality tend not to recover. Four of seven cases failed to recover.

I said above that I was prepared to abandon many of the descriptive categories which were used because I cannot see from my group of cases that they contribute any diagnostic, therapeutic or prognostic value. Some so-called simple depressions did not recover; all patients with panic attacks did recover; 10 of 12 depressions with anxiety attacks recovered; the depressions with puzzling recovered; the depressions with unreality feelings recovered; the depressions with agitation recovered except when cerebral arteriosclerosis was prominent, etc. The continuously alternating manic-depressive states did show a tendency not to recover; the depressions with marked hypochondriasis or invalidism showed the greatest tendency to fail to recover. This may be due in part to lack of diagnostic acumen, in the sense that except in cases under long observation it is difficult to decide how pervasive the mood is. I had the impression that continued situational difficulties might tend to prevent recovery but the facts do not seem to bear this out. Only in three cases of the non-recoveries did this seem to be true.

I studied the whole group from the point of view of mental disease background. I had to bear in mind that most of my histories were taken from the patients themselves, and that, furthermore, a positive history in this connection is more important than a negative history. Nevertheless the facts are interesting. Only a fifth of the cases had a history of attacks of mental disease in the family and this fraction was only increased to a third if one includes also unstable but non-psychotic progenitors. Two-thirds of the patients gave no history of mental disease background.

I again studied the group with reference to the number of attacks in which the patient presented himself. About one-half of the patients were in first attacks, less than one-third were in second attacks, and about one-eighth were in third attacks. These figures are not significant until one corrects statistically for (a) age grouping and the likelihood of recurrence in the one-attack group, after the seven year period studied,* (b) and the failure of some

* The average period between first and second attacks was 12 years—with a range from a few months to 29 years.

of the one-attackers to recover. Correcting for these factors, it would still appear that the chances for permanent recovery, after one attack, are at best between 30 and 50 per cent. Obviously the size of the series is too small and the period of observation too short to make statistical conclusions of this sort accurately valid.

However, in the group of over 8000 cases from the New York Hospital referred to above, the percentage ran about the same, about one-half of first attacks, one-fourth of second attacks, and one-tenth of third attacks. Unfortunately the New York series is not analyzed for age groups, is only an average period of five years, and does exclude non-recoveries from first attack.

A study of possible precipitating causes reveals the following:— 48 cases of the 144 or one-third showed no recognized precipitating factor. Business worry was assigned as cause in 29 cases; actual physical illness in 26 cases; family illness or death in 12; love involvement or overwork in 7 cases each, and scattered cases among situational disappointments, difficulty with children, childbirth, excessive responsibility, marital difficulties, etc.

Dr. Meyer has for many years stressed the importance of diurnal variation of symptoms as an important diagnostic sign in affective psychoses. Of my series 53 showed this sign; 40 of the 53 were suitable for analysis. All but 5 of these cases showed recovery. We can say that diurnal variation seems to give a slightly favorable weight to favorable prognosis. Of course the material can give no evidence as to its diagnostic significance.

In summarizing I should say from a review of 144 extramural cases of affective disorders that the Kraepelinian concept of manic-depressive insanity is valuable as indicating that the more pervasive the affect the greater the chance of spontaneous recovery, but that even predominating affectivity does not assure recovery and that admixtures of symptoms belonging to the organic, psychoneurotic or paranoid groups of reaction tend to militate against recovery but not in a definite and critical sense. The material further shows that recovery from affective illnesses may take place after much longer time than we ordinarily think. There is suggestive evidence that elation is distinctly rarer than depression and that therefore we may be including at least two different types of reaction under the one heading of manic-depressive. There is also some evidence that one attack tends to confer some "immunity" against subsequent attacks.

AGE INCIDENCE OF DEMENTIA PARALYTICA.

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The age incidence of dementia paralytica among patients admitted to the St. Peter State Hospital in the four year period ending December 31, 1931 has previously been reported.[1] During the four years following, from 1932 to 1935 inclusive, there were 2271 first admissions. Both blood and spinal fluid examinations were made in all but four cases.

Clinical and serological evidence of dementia paralytica was found in 155 individuals, or 6.8 per cent. Two boys 13 and 17 years old were not included as the disease was congenital and the symptoms atypical. The Wassermann reaction of the blood was negative in 18 cases, or 11.6 per cent.

The youngest in the group was a girl aged 19. One of the men was 70 and two were 73 years old.

During the eight years covered by the two reports there were 334 patients with dementia paralytica among those admitted to the hospital the first time. Of these 246 were males and 88 females. This ratio of 2.8:1 is less than the 3.7:1 found by Wile, *et al.*[2] and the 5:1 reported by Moore and Merritt.[3]

The percentage of dementia paralytica among the first admissions decreased from 8.2 in the first four year period to 6.8 in the second. The district served by the hospital did not change nor was there any appreciable shift in the general population.

(See table on next page.)

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AGE DISTRIBUTION OF DEMENTIA PARALYTICA AND RELATIVE FREQUENCY IN THE CORRESPONDING AGE GROUP.

	1928-1931.						1932-1935.					
	Number admitted.			Incidence per 100,000 population.			Number admitted.			Incidence per 100,000 population.		
Age (years).	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
15-19	0	0	0	0	0	0	0	1	1	0	2.1	1.1
20-24	1	2	3	2.2	4.8	3.6	0	1	1	0	2.4	1.2
25-29	3	5	8	7.7	13.0	10.2	1	0	1	2.6	0	1.3
30-34	12	5	17	31.6	13.5	21.8	8	2	10	20.9	5.3	13.2
35-44	35	18	53	47.2	26.5	37.0	48	10	58	64.7	14.6	41.4
45-54	51	13	64	92.7	26.0	60.0	39	15	54	70.3	30.1	51.3
55-64	16	8	24	40.0	20.3	32.0	19	5	24	47.3	14.3	32.1
65-73	6	3	9	23.0	13.6	18.7	6	0	6	22.9	0	12.4
75 and over	1	0	1	10.0	0	5.0	0	0	0	0	0	0
Total	125	54	179	23.9	10.9	17.6	121	34	155	23.1	6.9	15.2

EMOTIONAL RESPONSIVENESS IN CLINICAL INTERVIEWS.*

By JOHN C. WHITEHORN, A. B., M. D.,
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The purpose of this communication is to report briefly some observations bearing on the emotional relationship between doctor and patient. Those who have had the time and opportunity to study closely the progress of individual patients in a mental hospital are well aware of the importance of this relationship in the care and management of the psychoses. As for the ultimate outcome, differences of opinion do exist concerning the critical importance of rapport; but within those ultimate limitations I am sure no argument is needed to persuade an experienced group of psychiatrists that a patient's emotional attitude toward his doctor makes a considerable difference in determining how good an adjustment can be made.

The much desired information about the technique for obtaining good rapport with patients remains, however, for the most part concealed behind the huge variables of personal aptitudes and unformulated experience. Even with the most earnest desire to disentangle the forces at work, for the sake of scientific understanding, the psychiatrist who is often successful in establishing good rapport has great difficulty in trying to tell the rest of us how it is done. Some of the difficulty arises, no doubt, from the fact that the development of rapport is not a separate set task but proceeds alongside of, and intimately mixed with, the other functions of the doctor-patient relationship such as the physical examination, the explanation of the hospital life, the treatment of physical ailments, the development of a daily program, the talks with relatives, etc.

One general principle can, I think, be stated with fair certainty, that the development of rapport requires an emotional reaction toward the doctor. A steady indifference blocks rapport. Any

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

kind of response is better than none at all. The observations which I wish to report today have a bearing on this principle. These observations do not by any means tell how rapport is developed, but they throw a certain light on the emotional responses of patients during different types of clinical interviews.

The data reported here were collected during experiments on heart rates carried on with Dr. Kaufman and Dr. Thomas.[1] I wish to acknowledge here my indebtedness to these gentlemen, and also to Dr. Helen Richter and the Mason's Committee on Research in Dementia Præcox, by whose aid the records have been analyzed. I am reporting here the observations on 12 male subjects (six schizophrenic and six depressive patients). This particular selection was made for this paper because these are the more difficult types of patient to interview. In these experiments, the patient's heart rate was continuously recorded, beat by beat, on an instrument we have called a cardiochronograph, which is electrically connected through a cable to chest electrodes. For this report, I have selected and analyzed portions of the heart record in three periods during the same session with a given patient. These sessions lasted about two hours. During one portion of this time, the patient was quietly resting alone in a room. That is called here the "rest period." It serves as a kind of "control" by which to judge the other periods.

During another period, the patient was being interviewed in the question and answer fashion, that is, a doctor quizzed the patient about his condition, his symptoms, his history, his social relationships, his sexual experiences, etc. Since the main object of these experiments at that time had been to elicit material of emotional significance, the questioning was very pointed and rather insistent. We observed a fair amount of talk and overt behavior of the kind commonly called emotional—wringing of the hands, sad expressions of the face, even a few tears, sometimes a gesture of anger, or a flushed face. The kind of interview just described is here called the "question interview."

During a third period, the patient was engaged by the doctor in casual conversation, in which the doctor participated freely, not holding himself to a questioning rôle, but making comments, listening, smiling and doing whatever seemed appropriate to keep up a free and easy conversation. The topics were quite diverse, selected

at random—political news, sports, the pictures on the walls, the pattern of the rug on the floor, the repair work being done on a neighboring building, and that old reliable topic, the weather. As you all know, it requires at times considerable ingenuity to keep up a conversation like this with the kind of patient studied. In some instances (not reported here) we had no success in this effort. These periods of informal chatting might aptly be called "talk about the weather," but they are labeled here "participation interviews."

The volume of statistical data available in the heart records in these 12 experiments is rather appalling, but I have kept the number of separate measurements down to about five thousand by selecting, by inspection, representative portions from each period for precise measurement. The characteristic of the heart record on which I shall speak here is the unsteadiness of heart rate, which is represented by a figure indicating the rate of change per beat, expressed as a percentage, that is, how much, on the average, the duration of each cardiac cycle differs from the duration of the preceding cardiac cycle.[2] For our normal controls, during interviews, this figure has a mean value of 4.4 and in rest periods 2.6.

The values of this figure, representing the unsteadiness of heart rate observed in the subjects here reported, are displayed in Table 1. Two facts are immediately seen by inspection of these

TABLE 1.

	Rest period.	Question interview.	Participation interview.
Depressive patients:			
S	3.2	4.0	5.1
M	1.4	1.6	1.9
C	1.5	2.2	2.4
H	2.4	2.6	2.9
B	2.4	2.1	3.3
MG	4.3	4.7	9.8
Schizophrenic patients:			
S	4.4	3.3	4.5
T	3.4	3.1	4.6
H	1.4	1.7	2.2
B	3.7	3.4	4.2
E	1.9	2.1	3.4
W	1.9	2.4	3.4

data: first, the unsteadiness of heart rate tends to increase during interviews, as compared to rest periods, although there are exceptions to this tendency; and second, the participation interview shows a greater unsteadiness of heart rate than the question interview, and this rule holds true for each subject. This difference does not mean that the participation interview produces extreme unsteadiness of heart rate, but rather that the question interview produces relatively slight unsteadiness.

Another mode of expressing these tendencies may help to fix them in mind. On the average, the unsteadiness of heart rate is 52 per cent greater in the participation type of interview than in rest periods, and this increased unsteadiness is approximately the same for both schizophrenic and depressive groups, 44 per cent for the schizophrenic and 59 per cent for the depressive. But the question type of interview raised the unsteadiness only 15 per cent above the rest period in the depressive cases. In one case, it was actually steadier during the question interview than in the rest period. Among the schizophrenics, half of them had steadier heart rates during question interviews than during rest periods, and the average increase of unsteadiness for that type of interview was only a questionable 3 per cent.

What meaning is to be attributed to these experimental findings? Our observations on normal subjects are consistent with the proposition that, for a given person, an increased unsteadiness of heart rate is an indication of acute emotional disturbance. More specific claims have been made regarding the correlation of specific emotional states with acceleration and deceleration of the heart rate (*c. g.*, Wundt and Lehmann), but these finer correlations have not been uniformly confirmed, and the statement made by Angell and Thompson [3] at the turn of the century probably represents best the bulk of the evidence. They said, "Whatever the average change of (heart) rate may be, a more uniform and, in our opinion, more significant feature is the spasmodic irregularities of the rate characteristic of curves corresponding to emotional states."

One feature of psychotic behavior makes necessary a certain discrimination in speaking of the emotional states of patients. A good many patients are found putting on a kind of theatrical show of emotion but in so unconvincing a fashion that the observer readily senses its shallowness. Some kind of a distinction needs

to be maintained therefore between the outer emotional talk and behavior and the inner emotional reaction. They are not always in agreement and not always in disagreement. The unsteadiness of the heart rate record provides an indication of the inner emotional reaction. There is no means of knowing whether it indicates the *inmost* emotional reaction, the actual feeling itself. But it gives us a tangible something to compare with the overt display. With these explanations and qualifications, increased unsteadiness of rate may be taken as an indication of inner emotional responsiveness and the experimental findings may be taken to mean, I think, that the participation type of interview elicits a more marked inner emotional response than does the question type of interview.

These experiments do not of themselves bring direct evidence bearing on the problem of rapport. They do bring evidence, however, on the relatively great importance, emotionally, of the casual participation by the doctor in the incidental interests of the patient, as contrasted with the bombardment by questions on affairs of apparently more vital importance. In this indirect way the evidence presented here tends to emphasize the relatively greater significance of the casual interchange of comments between patient and physician as important for arousing an inner emotional response and hence important in building up an emotional rapprochement between them.

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SOME PSYCHIATRIC ASPECTS OF BIRTH CONTROL.*

By SARAH R. KELMAN, M. D., New York.

The question of birth control has been the storm center of church and state for many years, even today in 1937, one is somewhat timid about presenting the subject in polite society. Papers have been written and statistics compiled for and against the practice. The problem has been attacked from every angle—religious, moral, economic, social and health.

All this time the medical profession as a body was reluctant to recognize contraception as a medical problem. Every physician knows how universal is the practice of contraception, yet they failed to accept the responsibility for providing safe and efficient methods.

Strange to say, many otherwise intelligent and enlightened individuals still believe that birth control, as a social practice, began with Margaret Sanger. Few have taken the trouble to acquaint themselves with the history of contraception, although the literature on the subject is quite voluminous, some good, some indifferent. Himes [1] in his "Medical History of Contraception," published in 1936, has done a valuable piece of research. He reviewed everything that has ever been written on the subject—a most thorough, exhaustive and very revealing study. He mentions some 2000 titles of books and periodicals, and traces the practice of contraception to prehistoric man, to the primordial tribes, "of which contemporary primitive races may be said to be the social fossils." He finds the earliest written records on the subject in the Petri Papyri of Egypt, dating back to the twelfth dynasty, 1850 B. C.

Beginning with the papyrus records of more than 3700 years ago, attempts have continued, with varying success, to simplify and humanize the practice. Since the beginning of time, mankind has attempted to limit its numbers for one reason or another, first by means of charms, potions, incantations, continuing through infanticide and abortion, and various taboos on sex relations. From the

* Read at the annual meeting of the American Psychopathological Association, in conjunction with the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

time the rôle of the male as a factor in conception was recognized, coitus interruptus played a major part.

Throughout the early Greek and Roman literature we find descriptions of various methods of contraception. During the Middle Ages, the great Islamic physicians, the Arabians, and the Persians contributed to the subject. Even the Talmud mentions embryotomy, coitus interruptus, spongy substances placed before the os, violent body movements, and potions, as methods of contraception. Curiously enough, although the early Hebrews disdained sterility, as did every primitive group, the obligation to be fruitful and multiply was not incumbent on the woman, but only on the man.

After the publication of Malthus's essay on population (1798) the medical history of contraception became intimately intertwined with the social and economic phases of that history. Thus it was in the late eighteenth and the early nineteenth century, with the sudden increased growth in population—due to industrial expansion when life was speeded up—that the birth control movement received a strong impetus.

Social agitation for birth control in modern times dates back to Francis Place and his dissemination of popular medical handbills in 1825, and to the publication of Richard Garlile's "Every Woman's Book" (1826). Place's efforts were the first organized, planned attempts in history to educate the masses in contraceptive technique.

The popularization of birth control knowledge in the United States began in 1831 with the publication of Robert Dale Owen's "Moral Physiology," And "The Fruits of Philosophy, or, The Private Companion of Young Married People," by Charles Knowlton, in 1832. Then followed a widespread circulation of birth control literature which prepared the public mind for clinics for the poor. The first such clinic in the world was opened in Holland in 1881, the second, in this country by Margaret Sanger in Brooklyn, in 1916. The storm of opposition raised by this clinic is still remembered by many. The protests from many quarters released a wave of what may be called "soap box oratory," regrettable but unavoidable. Every advance in civilization has been made over the dead bodies, if you will, of the timid, the backward, the conscientious objectors, the bigots, and the worshippers of outworn dogma.

During such struggles, brick bats are more often in evidence than silk gloves. It was no doubt during this stage of notoriety that the term "birth control" fell into disrepute, and caused conservative bodies such as the medical profession to shrink from it.

Nor is this attitude difficult to understand. We physicians are healers, not fighters. We dislike ballyhoo and notoriety. We make our scientific advances, or fights, if you please, at the bedside and in the laboratory, not by propaganda. We must, however, face the facts of history. The practice of contraception is as old as mankind itself, and is universal. It has survived through the ages in all cultures. It has survived nearly two thousand years of anathema by Christianity. Opposition is futile and foolish, no matter what our individual opinion on the subject may be. Intelligent planning of the family belongs in the framework of medicine, if not to cure disease, certainly to prevent it. In our opinion, it is preeminently a mental hygiene problem. It behooves us as physicians to face it honestly and squarely. The "lay" bodies that have done all the militant work—the spade work—are anxious and willing to turn the job over to us. Those of us who resent the intrusion of lay organizations in medical practice have only ourselves to blame. We must improve our knowledge and technique by dispassionate research and study.

It must be borne in mind that a safe and scientific contraceptive device prescribed by a physician is not a mandate not to have children—it is simply an instrument by means of which married couples may plan their families according to some rational scheme, plan in such a way that there will be no waste or drain, economically, physically or emotionally, either on the parents or on the children.

Pearl [2] in his most recent study on "Fertility and Contraception"—a study aided by grants from the Milbank Foundation—says: "Data . . . . indicate that women practicing birth control resort to criminal abortion more frequently than women who do not practice birth control." Why? The answer is obvious. A couple who decide that they will not or cannot afford any more babies will go to any length to prevent a pregnancy; when they fail with the particular contraceptive device used, they resort to abortion.

Modern psychiatry has taught us two very important lessons: first, that an adequate adjustment to life is intimately bound up

with a fair sexual adjustment; second, the concept of the total personality, the realization that human ills, be they physical, emotional or sociological, will never be adequately treated until we come to a full realization of the extent to which one influences the others. As psychiatrists, one of the most frequent and most constant symptoms we have to combat is anxiety. We are concerned with the emotional stability, not only of our patients, but of their families as well, especially the children. Individuals apparently free from intrapsychic conflict will often react neurotically to poorly discharged sexual tension; fear of pregnancy in a neurotic man or woman often plays havoc with the home and children. Furthermore, repeated failure with the contraceptive used creates a fear of pregnancy in emotionally unstable men and women, which is apt to disrupt the family.

A frigid woman will often use such a failure as an excuse to deny herself to her husband. If this proves impossible, she will seek refuge in repeated illnesses, thus driving the husband to other women or into a neurosis. A mildly neurotic man with a strong mother attachment and weak potency is often rendered completely impotent by the use of condoms or the practice of coitus interruptus, especially if an "accident" happens and conception takes place in spite of all precautions. Or, he may develop a pregnancy phobia, with everything that such a phobia may imply. Very often under such circumstances the husband is impotent to his wife, but not to other women. This leads to marital discord, and not infrequently to invalidism or divorce.

One patient who requested contraceptive advice said that she and her husband had been abstaining from marital relations for the past 10 years because they feared pregnancy and had failed with every contraceptive device they had used.

Finally, every psychiatrist knows the influence of emotional factors on the menstrual cycle. Psychotic women may develop amenorrhea lasting months or years. In the neuroses this is equally true. In the nine years we have been interested in modern contraceptive technique we have had occasion to interview hundreds of women. We found that the so-called normal woman also reacts very frequently with a delay in her menstrual period to even a mild emotional upset.

Economic expediency, physical handicaps, emotional instability, fear of pregnancy, menstrual irregularities, all seem to have a definite relation to contraception. So far, however, they have remained as isolated facts floating in the air. On the basis of our study, we are convinced that, while economic forces play a tremendous rôle, the emotional aspect of contraception is the more important.

This paper is based on a study of 400 women who sought advice on contraception at one of the birth control centers in New York.[3] These women all belong to the underprivileged group, the majority being on public relief. Yet they married, some of them as young as 15 to 17, and they all had planned babies. In fact, a large number were referred by the hospitals where their babies were born. Some were referred by various social agencies because of physical conditions which would make pregnancy a health hazard, a few were referred by mental hygiene clinics because of emotional disturbances of the patient or the husband. Some were approaching the menopause. In age, they ranged from 16 or 17 to 50. They were mostly foreign-born, or first generation American born white—Italian, Russian, Polish, Czechoslovakian, Jewish, German, and some mixed marriages. In religion, there were 253 Roman Catholics, 112 Hebrews, 30 Protestant and 5 Greek Orthodox.

This study was intensive rather than extensive in scope. Every patient was personally interviewed by the author, the contraceptive method was prescribed by her, and the patients were carefully followed for a period of from six months to three years, being reexamined at six-month intervals. Because of the psychiatric approach, we were able to elicit more information than is otherwise secured, or is necessary in such centers. The advantage of our method over the questionnaire became apparent when we attempted to evaluate and classify our data.

Certain facts came to light early in our study, notably the large percentage of frigidity, and the rôle played by anxiety in causing a delay in the menstrual period. Very often such a delay led to an abortion on a non-pregnant uterus. Today the Ascheim-Zondek test makes such guesswork unnecessary. There are still many patients, however, who have never heard of such a test, and the abortionist takes care not to inform them. One patient had 14

such abortions, which in the light of subsequent developments, proved to have been unnecessary.

On the other hand, many of our patients in their panic and ignorance are so certain that a delay means pregnancy that we have a hard time convincing them that they are wrong. The abortionist usually impresses on his patients in no uncertain terms the danger of waiting longer than 10 days. There is "danger" indeed that the patient will begin to menstruate, and the abortionist will lose his fee.

In this connection, we have had this very interesting experience on numerous occasions. A patient reports a delay in her menstrual period, and becomes panicky. Because we know her contraceptive technique to be perfect, we are able to reassure her. If she has not been using the method long, she refuses to be reassured. We then order an Ascheim-Zondek test. That night before she has had time to take her urine to the laboratory, her period is established. This has occurred over and over again in clinic as well as in private practice. Very often on the first visit patients will themselves tell us that whenever they are upset, their period is delayed. We now make it a practice to tell every patient on her first visit, "For the first few months you may lack confidence in this method or in your ability to use it correctly. That anxiety in itself may cause a delay in your period. If that happens, do not worry, but come back and talk it over with us. If you have followed directions, you need not worry."

It is pertinent to our immediate problem, namely: "frigidity and impotence in relation to contraception," to mention the various methods in vogue today:

1. Abortion is still, regrettably, too popular. We shall never know the exact number of abortions that are performed every year. According to Bromley,[4] Dr. Fred Tausig, associate professor of gynecology, Washington University, conservatively estimates the number per year in this country to be 700,000, while Rongy estimates it to be nearer 2,000,000. Our own series, although small, shows an unusually high percentage of abortions. Of the 400 patients studied, 177 had abortions; some had as many as nine. The total number of abortions was 387—178 "spontaneous" and 209 induced.

2. Coitus interruptus ranks first in importance and is perhaps the most widely used, it requires no appliances and is always available.

3. Condoms or sheaths (rubber or fish skin) are very popular. Himes [5] states that records, although not authentic, of the use of the sheath, have been found in imperial Rome. The first written mention is that in Fallopius' "De Marbo Gellico" (1564). It was first used for protection against syphilis; it then came to be used for contraceptive purposes, and by the end of the eighteenth century it was advertised publicly in England. When we realize that one million and a half sheaths are manufactured every day in this country alone, we can get a slight inkling of how widely they are used.[6]

4. Following the above three most popular methods, are a host of others much less reliable, less widely used, such as various douches, suppositories and jellies.

5. Withholding of orgasm.

6. The safe period.

7. Metal caps and pessaries.

None of these methods is very safe. Some are safer than others for some people, but there are too many sources of error, aside from objections of an emotional nature, which we shall discuss later. Of the 113 patients who practiced coitus interruptus, 61 had failed—a total of 112 failures. Of the 90 who used condoms, 32 failed 53 times. The douche was used by 23 patients, 16 failing 21 times. There then follow all kinds of combinations of the above methods plus suppositories, jellies, gold buttons, the safe period, etc.

8. Finally, the method advocated by the American Birth Control League—the occlusive diaphragm with a straight or watch spring known as the mensinga, or one with a coil spring called the ramses, and the rubber cervical cap, the most popular being the mizpah. These are used in conjunction with a contraceptive jelly which serves a triple purpose: (a) it is mildly spermicidal; (b) by its viscosity it serves to obstruct the progress of the spermatozoa; (c) it lubricates.

The rubber pessary—mensinga—was invented by a German anatomist of that name in the early nineteenth century. The inventor of the rubber cervical cap is unknown, but it appeared in England about the same time and is still widely used.

In his paper on anxiety neurosis, Freud [7] shows conclusively that the etiological factors for this clinical entity must not be sought in deep-seated intrapsychic conflict, but rather in poorly discharged sexual tension in adult men and women. Principal among the causes of such frustrations he blames certain types of contraceptives. These usually affect only one of the partners, depending on whether the wife or the husband gets satisfaction in coitus. If the wife escapes a neurosis, the husband gets it. Coitus interruptus is a well-nigh impossible method of contraception for a man who suffers from ejaculatio præcox. Even under ordinary circumstances his wife is apt to develop an anxiety neurosis; when in addition the fear that the husband will fail to withdraw in time is added to the former handicap, satisfaction for the wife is impossible. As evidenced by the impaired potency of such a man, he is suffering from a deep-seated neurosis so that the psychoneurosis of the husband, plus unsatisfactory contraceptive measures, produce an actual, or anxiety neurosis in the wife.

Condoms are not injurious to the wife if both she and her husband are equally potent. If they are not, this form of contraception is not less injurious than coitus interruptus.

Coitus interruptus is injurious to the wife if the husband pays no attention to whether she is satisfied or not. If, on the other hand, the husband is considerate and waits for his wife's satisfaction, coitus will be normal for the wife, but the husband may develop an anxiety neurosis.

Freud [8] sums up the situation in his paper on "Sexual Morality and Modern Nervousness." He states: "Thus we come closer to the question of whether sexual intercourse in legitimate marriage can offer full compensation for restraint before marriage." He concludes that it does not, "because civilized sexual morality restricts sexual intercourse even in marriage. . . . . Since all contraceptives available either impair sexual enjoyment, disturb the finer sensibilities of both partners, and even act as direct causes of illness. . . . . Under the spiritual disappointment and physical deprivation which thus becomes the fate of most marriages, both partners find themselves reduced again to their pre-conjugal condition but poorer by an illusion."

Furthermore, if, as so frequently happens, a failure results with either one or the other of these methods, the anxiety becomes so

severe as to completely incapacitate either one of the partners, or else lead to marital discord, desertion or divorce. The following case is illustrative:

About nine years ago, Mrs. G. was referred to us for advice on contraception because of a severe neurosis of the husband. The history was one frequently seen in psychiatric and psychoanalytic practice. Mr. and Mrs. G. were very much in love when they were married 10 years previously; both came from educated, cultured and moderately wealthy families. They seemed well suited and apparently destined to be very happy. Mrs. G. felt that a baby would make their lives complete, but to her surprise, her husband did not share her enthusiasm. In spite of the use of condoms, she conceived a few months after they were married, but the husband would not let her go through with it. She was too young, he said. He wanted her to have a good time before she tied herself down with babies. Very reluctantly she submitted to an abortion, but when another "accident" happened three and a half years after they were married, she refused to "do away with it." The husband stormed and raged, but it did him no good, and Tommy was born. Mrs. G. had her baby but almost lost her husband. She said, "He was passionate enough before the baby came, but I think Tommy took it all away from him." She spoke more truly than she knew. "All the time I was pregnant," she added, "he never came near me. He said he was afraid he would hurt the baby."

When relations were reestablished some time after the baby was born, coitus was reduced from three or four times a week to once a month. She said, "My husband is afraid I'll become pregnant again, and now he says he has no pleasure when using a condom. He says he enjoys coitus away from home, but not with me."

When the baby was not quite three years old, she became pregnant again, and a second abortion was performed. She was too much in love with her husband to risk his further displeasure. As it was, their life together lost much of its original bliss. Accidents continued to happen, however, and when she conceived a fourth time, another declaration of independence followed. She refused to interrupt the pregnancy.

When she came to us, Tommy was 5 years and 10 months old, and the baby, Paul, was 15 months. From the time Mrs. G. became aware of her fourth pregnancy to the time she came to us, almost two years later, her husband had not come near her. He became a changed man. Poor Mrs. G.—a normally sexed young woman of 30—was made very unhappy. To the privation caused by her husband's neglect was added bitter humiliation. She was sure her husband no longer loved her, that he must be in love with another woman. She wanted a divorce, but was too humiliated to discuss the situation with members of the family. It was the family physician who finally came to the rescue. He sensed something wrong. He pressed her for an explanation and advised a psychiatrist.

Even without a psychiatric study, it would not be difficult to reconstruct the psychopathology of Mr. G. He had a very strong attachment to his mother with unconscious incestuous wishes for her. His wife's pregnancy made her a mother—hence, "mother" whom he could not approach because of the incest taboo, and impotence was the result. Humiliation kept him from taking his wife into his confidence and made him irritable and unhappy.

Mrs. G. was fitted with a diaphragm and instructed in its use. This happened eight years ago. So far, the method prescribed has been successful—no failures reported. With the increasing security in the efficacy of the contraceptive device, Mr. G.'s interest in his wife returned, and their life together seems to be running smoothly.

It would be presumptuous to suggest that proper contraception cured Mr. G.'s neurosis, or his infantile dependence on his wife, or his jealousy of his own children. He has always been mildly neurotic but was able to function normally as long as there was no additional stress or strain. On this basis he now continues to function very well.

Huhner,[9] in discussing female frigidity, makes the statement that many men and women do not realize that a normal woman is endowed with strong sexual feeling and consequently she is given no consideration. Such women suffer in silence and never know the cause of their irritability and nervousness. Some women suffer so intensely that they often seek relief in divorce. Indeed divorce at times would prove the lesser evil. Rongy[10] claims that sexual and psychologic reactions often produce more disturbances than the derangement induced by actual pathologic changes in the genital tract. Were a psychiatrist to make this statement, it would be considered an overstatement; coming from a gynecologist, we are very ready to agree.

In their study on "Adult Sex Hygiene and Family Case Work," Lurie *et al*[11] find that instruction (in contraceptive technique) of both husband and wife helps to reduce the problems of sexual incompatibility and domestic friction by giving them a point of agreement and cooperation. The marital relation is improved also by the reduction in fear of pregnancy with its interference in the gratification of sexual relations. Any unbiased student must admit that sexual frustration, from whatever source, results in quarrels, unhappiness, infidelity, neurosis, desertion and divorce.

Admitting, then, that, as Freud says, all forms of contraception used are injurious, and that couples who for one reason or another feel that they cannot have more children, will continue to use

contraceptives in spite of their injurious effect, and admitting, furthermore, that the monogamous marriage of our present-day culture is necessary for the maintenance of our civilization, it behooves us to find a contraceptive device which will be free from the objections mentioned, a method that will, as nearly as possible, promote a normal marital relation.

In the past 17 years the American Birth Control League has been sponsoring clinics where the most recent methods of contraception are taught. We believe that that method—the use of the occlusive diaphragm or rubber cap and jelly—is the best so far discovered, and affords as nearly as anything artificial can, a normal coitus.

In our present study we have tried as painstakingly as possible to check the statement made above. We have taken, as our criterion, the frigid woman. Horney [12] in discussing psychogenic factors in functional female disorders, finds women patients who come in to be analyzed, for whatever reason, have this much in common—they all suffer from frigidity in varying degrees.

The question is, can a more superficial disturbance in sexual adjustment, such as poorly discharged sexual tension, through faulty contraception, induce frigidity? A birth control clinic should, by acting as an experimental laboratory, furnish the answer to our question.

Huhner [11] states that any condition which interferes with the full completion of the act of coitus may cause absence of orgasm and pleasure. He lists coitus interruptus and ejaculatio præcox among the causes of such absence of pleasure.

Novak [13] states that there are many women "physically and psychically normal who love their husbands devotedly and lead otherwise normal lives, and perhaps bear children, who never experience sex satisfaction."

We agree with Novak on every point except the "perhaps." There is no "perhaps" about it. Frigidity in no way impairs fertility, as is amply borne out by our present study, though many women believe that they may prevent conception by not letting themselves achieve an orgasm. Nor can frigid women be said to be psychically normal. They may not suffer from an out and out neurosis, or even complain of definite symptoms, but a trained observer will find much poorly concealed anxiety in these women.

Those of us who handle behavior problems in children have an excellent opportunity to make such observations. We can often trace the unruliness of a child to her mother's sexual frustration. Thus the child's bad behavior can, in the full sense of the word, be classed as a symptom of anxiety in the mother, even though there may be no other symptoms.

Dickinson and Beam [14] in their study found that 36 per cent of women never experienced an orgasm, 14 per cent who experienced an orgasm perhaps once in their lives, 20 per cent experienced orgasm sometimes, and only 4 per cent were said to have experienced an orgasm regularly.

Marie E. Kopp [15] in her study found that among 8544 women, 20 per cent never experienced an orgasm, 58 per cent only occasionally, and 42 per cent usually. "Occasionally" means once in a while, seldom, very occasionally, rarely, and "only a few times in my life."

It is important to note that these were apparently normal women, or at least were considered so. The information in most of the studies was obtained from either case histories or questionnaires. In our series, where the study and follow-up was conducted by the same worker, approximately the same figures were obtained, with this difference—many patients who on the first visit to the clinic said they *usually* experienced orgasm, really did not know what they were talking about. Thus after close observation over a period of a year or more, many of the patients who originally reported an orgasm usually were later transferred to the *never* column—that is, never until recently when with the security afforded by the diaphragm they experienced an orgasm for the first time. Curiously enough, many women think they are experiencing an orgasm when coitus is merely not distasteful.

Altogether 400 patients were studied. The response to the question—Do you experience an orgasm?—is shown on page 329.

On the basis of our original histories and follow-up studies we found that 80 of these 400 patients showed severe neurosis. In 34 cases the husbands were neurotic. Of the husbands reporting their reactions to the use of the diaphragm, only 10 have objected to its use. Of those patients who have been followed over a long enough period of time only 4 report a diminished orgasm as a

Always	95	or 24 per cent.
Usually	47	or 11 per cent. (We are certain from our experience so far that many of these will fall in the "Occasional" column.)
Occasionally	94	or 23 per cent.
Very occasionally	9	
Seldom	22	
Rarely	14	52 or 13 per cent.
Very rarely	4	
Dysparunia	3	
Never	78	or 20 per cent.
Special conditions	34	or 8 per cent.

Only in the superior position	1
Usually but at times causes nausea	1
Usually but at times she hates it	1
Usually but sometimes hates it	1
Never with a condom, always without	1
Never with a condom, always during pregnancy or without condom	1
Never now, always up to birth of third baby	1
Always until two or three years ago, never now	4
Always until six months ago, never now	1
Always until six years ago, never now	1
Always until last pregnancy, never now	1
Always until operation, never now	1
Occasionally until birth of last baby, never now	1
Rarely since second pregnancy	1
Occasionally before birth of child, never now	2
Only when pregnant	3
Occasionally when pregnant	2
Always when pregnant, occasionally otherwise	5
No intromission for a number of years	2
Never before birth of baby, occasionally now	1
Abstinence for ten and six years respectively	2

result of the use of the diaphragm, and 67 report the appearance of orgasm for the first time in their lives or a definite improvement in their enjoyment of coitus. In some others the observation period has been too short for the patient to feel secure enough in the use of the method to stop worrying. Of the 67 who reported an improvement in or appearance of orgasm, 21 or 28.5 per cent had never previously experienced an orgasm. Nineteen had previously reported an orgasm seldom or very rarely and 24 had previously reported an orgasm occasionally.

Of the four patients who reported a diminished orgasm as a result of the use of the pessary, one (R. La F) is definitely a mental defective. Originally she reported orgasm occasionally but said she was afraid to have an orgasm because she might get "caught," and she can never endure relations when pregnant. We had a great deal of difficulty in teaching her the method. She has been under observation for almost two and a half years, reporting at three-month intervals and during that time she reported at times an increase, at times a decrease in orgasm. She has never used the method regularly because she has a "fallen womb" and "pain." However, the husband likes the method very much, and although very kind and indulgent, is urging her to use it because he is becoming nervous as a result of using condoms and practicing coitus interruptus.

The second patient, Mrs. R. P., came for advice when her baby was three months old, her first pregnancy. Examination revealed very poor involution of the uterus. She still had a blood-stained discharge. Originally she reported that she always had an orgasm. After using the diaphragm for about eight months she reported the method satisfactory to both her and her husband, would not do without it. More recently she reports that although she likes the method, she finds that recently she has no feeling, and she is also gaining weight rapidly. She thinks this is due to the pessary. Most likely both the frigidity and gain in weight are of endocrine origin.

Mrs. M. B. came because she had two babies within one year of each other, the last one was a placenta prævia. She is very nervous and anemic, she had one period in two years, and her husband is under treatment for a luetic condition. She originally reported that she seldom had an orgasm. When she came six months after being fitted she said her husband liked the method but that she has orgasm even less frequently with the diaphragm than before; but she added, "Anyway, I am afraid to be with my husband because he has syphilis." Her syphilophobia, plus her own poor physical condition, may in large part account for her diminished orgasm.

Finally, B. J. S. is a colored girl of definitely moron intelligence. She says she usually has an orgasm but at times does not want to be bothered. She constantly complained of difficulty in using the pessary, although her technique is very good. Anyway, she had been sick, she said, and was told

she needed an operation. "Besides, he don't worry me nohow, Doctor, and I don't feel like having anything to do with my husband. If my husband never bothers me I am satisfied. But my husband likes it very much. I just has no feeling." Continued observation of this patient convinced us that she has always been frigid and when she originally said she usually had an orgasm she probably meant she had no objection to coitus, as so many women confuse absence of displeasure with pleasure.

Mrs. E. K. S. is an especially interesting case. She has been attending our clinic regularly for three years. She is said to have had a pregnancy psychosis, is extremely neurotic, and so afraid of pregnancy that she had had no coitus for six months. She had never experienced an orgasm, and did not know what it meant. This patient went through a series of episodes during which her period was delayed for two days to two weeks. Each time she returned to the clinic in a panic. "If I am pregnant, I'll kill myself," she threatened. "We are so poor and suffering so much." A series of A-Z tests, however, had reassured her and now after using the method for about three years she said, "My period is delayed but I am not worried because now I know I used it every time and I have confidence in the method." Incidentally, for a long time she used the diaphragm irregularly because she did not trust it. This is the type of patient who, if she conceives because of the irregular use of the diaphragm, will be sure to blame the method. Such a patient is usually afraid to admit her delinquency. Besides, she vainly hopes that by throwing the responsibility on the method she can induce the physician to do something. Many still believe that birth control clinics perform abortions.

Mrs. M. B. S. had many reasons to fear additional pregnancies. Her husband has a cardiac condition, and she herself has had a nervous breakdown during one of her pregnancies. At the time of coming to the clinic she complained of weakness and dizzy spells. She was sexually indifferent, although she had an occasional orgasm. Six months after the initial visit she reported that she was not using the diaphragm; said she was afraid, and would rather her husband left her alone. "I don't intend to make it too easy for him," she said. After much persuasion she promised to give it a trial. She did so, and when she made her second visit six months later, she looked like a different person. She seemed about ten years younger and much happier. At the examiner's look of pleased surprise at her appearance, she smiled and said, "You remember you told me I was nervous, I was a nervous wreck, but I am not now. I feel more secure. My husband was doing more work for a time and I could buy a few little things for myself and the children. Now he is again out of work, and the little nest-egg is diminishing, but it won't get me now. My husband won't come near me without the pessary and I *enjoy* it every time now." This patient was really a transformed individual.

Mrs. B. T. S. is another case in which both patient and husband are very nervous. She was referred to us by a mental hygiene clinic where her

husband was a patient in April, 1934. She reported "orgasm usually." It took much time and reassurance to make her use the pessary regularly. After trying to use it for about eight months she and her husband were still very nervous about the safety of the method. The husband thought he could feel the rim of the diaphragm. We kept reassuring the patient and when she came six months later, she said everything was satisfactory, "but no matter how excited I get I can't achieve an orgasm in the past two months." This patient continued to vacillate between like and dislike of the diaphragm until she had used it for a year, at which time she reported everything satisfactory. During her most recent visit to the clinic she said, "I tell you the truth. In the past year I enjoyed it better than ever before. I know when I first started using it, it took me months to get used to it. I just wanted to get through and have it over with. But now I enjoy it 80 per cent of the time, and my husband no longer comes quick."

This last patient illustrates a very important point; namely, that one has to have the psychiatric approach in order first to gain the patient's confidence, and secondly to persevere and not to be disappointed if results are not immediately obtained. It would be presumptuous to suppose that every case of frigidity or even the majority can be cured simply by proper contraceptive methods. But we must bear in mind that most of these patients are not the type that would seek psychiatric treatment. They go on being miserable and unhappy, become irritable and quarrelsome, never suspecting what ails them.

This study does teach us, however, that worry from whatever cause will induce a frigidity with neurotic symptoms belonging to the anxiety or actual neurosis variety, and that with patience and persistence the method advocated will remove this frigidity and in many cases restore a fair degree of potency in men, especially the type of man who fears pregnancy and the rivalry of his own children. The sure knowledge that he is safe from such an eventuality will remove that fear-induced inhibition, and make him function comparatively normally.

As to the safety of the method, most clinics report 90 to 93 per cent success. On first analysis, our figures seemed to correspond with the others, but on closer check up, repeated interviews after gaining the confidence of the patient, gave us further insight. In almost every case of failure the patient confessed to a slip up in the use of the method. The excuses are too numerous to mention but the excuse is always there and eventually the confession that once or twice they "took a chance." We must bear in mind that the

patients in our series are very poor, that they have very little privacy, that they are tired and harassed, and often too exhausted to bother or care, so that they take many chances. When they find themselves pregnant they are ashamed to admit their negligence.

Many cases of the so-called pregnancies were not pregnancies at all, as was often demonstrated when the patients could be induced to have an A-Z test or wait long enough for the period to be established normally. Strange as it may seem, this is not always possible. Mrs. S. H. T. offers an excellent illustration of the difficulties encountered.

She is 21 years old, married four years, came to the clinic 7-9-35, said she had had three pregnancies, two abortions of one and two weeks' gestation. (One must always take an abortion of one to two weeks' gestation with a grain of salt.) This patient did not begin to menstruate until the age of 15, the interval between periods is 30 to 54 days and the flow is very scant, lasting four days. This would suggest a mild, masked endocrine hypofunction. Furthermore, she is extremely neurotic, although she appeared sensible, jolly and contented. She said she had never had an orgasm, does not know why, loves her husband, but she guesses she would be the same with anybody. She came back six months later, very much worried because her period was a week and a half late. The period before that was 10-14-35, only the second since her baby was born. She came back 2-18-36 and said that on 12-18-35 she still had no period and went to an abortionist. She was very emotional and worried because she had had a period 1-10-36 and is now eight days over-due again. She insists she is pregnant, said she went to the same abortionist who performed the last abortion, he told her she was pregnant again. Fortunately, he refused to operate because the patient had not paid for the last abortion. She refused to have an A-Z test, insisting it was of no use. It seems to be a function of her neurosis to have abortions performed. She felt that the cost of an A-Z test would be wasted, she would rather pay the midwife. "It is the third time I am pregnant and it is all due to this method and I will not take another chance." Here she completely forgot that before she ever came to us she supposedly had two abortions. We did not hear from this patient again until 7-28-36, exactly one year from the date of her first visit. Then her sister, who is also a patient at our clinic, came in to see us. She said Mrs. T. had gone to Bellevue for a D. and C. There she was told she was not pregnant, that the trouble was due to something that was left over from childbirth. The sister said the patient would like to come back but was ashamed. 12-19-36 the patient did come back very shamefacedly. She now confesses that she had used the diaphragm only until she used up all her jelly, then her husband used a condom and this is what made her nervous and afraid she was pregnant. Nor are we at all certain that Mrs. S. H. T. will continue to cooperate.

Very deep-seated intrapsychic conflicts, not only are not resolved by the use of a contraceptive pessary, but the patients actually reject it as they reject their femininity. Such patients are devoting the greater part of their energies to escape their marital obligations. Fear of pregnancy in such women is not based on economic considerations. Rather it is a nameless fear. Such patients cannot tolerate the pessary any more than they can tolerate their husbands' attentions.

We have three patients in this series who have been using a diaphragm for from eight months to two years without telling their husbands anything about it, and the husbands are none the wiser. There is a type of man, perhaps slightly neurotic or mean, who is afraid that the use of any contraceptive will interfere with his pleasure, and he refuses to use anything himself or allow his wife to use anything. This may be so in the three cases mentioned, but their wives, being wise, are able to fool the husbands very successfully.

One husband, a very infantile, neurotic young fellow 22 years old, has given his wife much trouble. She is only 20, they have been married four years. It was a runaway marriage. They have two children, three years and fifteen months old, respectively, and are on relief. The husband refuses to use any precautions—said he did not care how many children they have; the city should take care of them. The wife threatened separation or divorce, but he only laughed at her. She finally went to court to ask for a separation, but the judge said she did not have sufficient grounds for separation. After working with this patient for about a year, we have at last succeeded in fitting her with a cervical cap which she has been using for about four months quite unknown to her husband, although he is suspicious because his wife is less nervous and fidgety during coitus.

Finally, we have had several women in our series who had a "voluntary" pregnancy. One little Italian lady decided when her sixth baby was born that her family was large enough. She was fitted with a diaphragm and used it successfully for about a year. Then the baby died. She was very much broken up about it and decided to have another baby to take its place. She gave birth to twins.

SUMMARY.

The voluntary limitation of the family is as old as the human race. The practice is universal.

It is the inalienable right of every couple to regulate the size of their family if they wish. They do it anyway.

Most contraceptives in general use are unsatisfactory, if not out-and-out unsafe, because (a) they do not always prevent a pregnancy; (b) they interfere with complete gratification and thus are apt to produce a neurosis indirectly; (c) either by inducing a delay in period due to anxiety or by an actual conception they expose the woman to the unnecessary risk and expense of an abortion. They lead to marital unhappiness, discord in the home, or even broken homes. Children in such homes have little chance to escape a neurosis.

It behooves us as physicians and psychiatrists to find an efficient, simple and unobjectionable method of contraception and make it available to our patients as a mental hygiene measure.

The rubber diaphragm, or cervical cap, as advocated by the American Birth Control League, has proved simple, efficacious and conducive to a normal sex relation; and although some claim only 93 per cent success, it has proved 100 per cent successful in this present series of cases. Any failures reported were due to lack of cooperation on the part of husband or wife, and not inherent in the method.

In 400 cases we found only 10 husbands who objected to the use of the diaphragm. From experience with patients who use it without knowledge of their husbands, we know the objection is based on an imagined interference with their pleasure, and not a real one.

Women who have always experienced an orgasm express themselves as much happier since using the diaphragm.

In our series of 400 cases, improved contraceptive methods have produced a definite return or improvement in orgasm in 28 per cent of the cases, with a consequent improvement in general health and mood, and a happier outlook on life. Even when there is no return of orgasm, the elimination of fear—the security—affords them serenity and contentment.

Many women have been saved the physical, financial and emotional strain of an unnecessary abortion.

Because it does remove unnecessary worry and relieves unnecessary tension, it makes for a more harmonious relationship between husband and wife, and a better home for the children.

It is not our intention to suggest birth control as a cure-all, but we do maintain that it is a very important adjunct to the armamentarium of every physician, especially psychiatrists, to relieve anxiety, so that the energy thus wasted may be utilized in the service of psychotherapy.

Our interest in birth control was born out of a desire to help our patients, little suspecting at first any deep psychological significance in connection with it. We had no preconceived notions either for or against its claims. Whatever of interest we found in this work was not a planned attempt at research. The facts were there all the time clamoring for expression. We are merely reporting what we saw over and over again for the past nine years.

We believe this subject merits further study and the serious interest of psychiatrists. As a mental hygiene measure, it is one of the finest and soundest investments we can make.

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LUNACY AND THE MOON.

By CARL E. TRAPP, M. D., Boston, Mass.

"A lunatic, or non compos mentis, is one who hath had understanding, but by disease, grief, or other accident hath lost the use of his reason. A lunatic is indeed properly one that hath had lucid intervals; sometimes enjoying his senses and sometimes not and that frequently depending upon the changes of the moon."—Blackstone.

The concept of the influence of the moon on human welfare has its roots deep in the antiquity of our ancestral heredity. It is generally admitted that no form of idolatry is older than the worship of the moon and that lunar worship is older than solar. These old beliefs still carry much of their potency today and many are those who fear, for example, to fall asleep in the light of the moon because of possible blindness, or maintain that seed should be sown in a waxing moon and the crop harvested in a waning.

Belief in the direct influence of the moon on the human intellect and understanding forms one of the most important and interesting chapters in lunar history; it is said that the Emperor Frederick II, if he wished greater council from his wisemen, would consult them in a waning moon which, in turn, was in a human and fiery or aerial sign of the Zodiac. However, for a better understanding of this history it is best to turn to the civilizations of the past for first glimpses of the framework that was to serve as a basis for later beliefs.

The moon was the recipient of much worship for both her good and evil influence on human life. Extending as far back as the ancient mists of Egypt, Babylonia and Assyria, the moon was receiving veneration; it was held to be the sacred standard of Egyptian science and Thoth, the god of wisdom and the measurer of man's moral life, was held to be its lord. The Pyramid Texts, written during the Fifth and Sixth Dynasties, and now known to contain the earliest sacred literature of Egypt, reveal how the early Egyptian offered his prayers to Thoth, god of the moon, for greater intelligence and understanding.

Previous to the time of Hippocrates, intelligence and understanding were believed to be located in the heart—hence our expression

" to learn by heart." Therefore, one of the most frequent sacred passages to Thoth would read, " I come, I am Horus who opens thy mouth, together with Ptah who glorifies thee, together with Thoth who gives to thee thy heart (*i. e.*, understanding), that thou mayst remember what thou hadst forgotten."

In the Babylonian-Assyrian period moon worship was accorded an even higher place than solar, and again the moon was closely associated with intellect and understanding. Speaking of Sin, who was God of the Moon, Jastrow states, " The ideographs with which the name of Sin is written show him to have been regarded as the God of Wisdom; but while wisdom and light may be connected, it is Nannar's character as the ' Illuminator ' that becomes the chief epithet of the god. . . . . it is, accordingly, as the God of Light that Sin continues to be adored in the Babylonian religion; and when he is referred to, in the historic texts and hymns, this side of his nature is the one dwelt upon. Through his light the traps laid by the evils spirits, which were active at night, are revealed."

By the time of the classical era, the waxing and waning moon definitely became associated with health and disease; a decreasing moon could be used as an aid in the disappearance of disease in that it was believed that the waning moon could be obliged, by incantation, to carry disease away with it; and medicinal herbs were gathered and applied at this time. A full moon, on the other hand, was thought according to Plutarch, to be propitious to childbirth. Furthermore, Macrobius wrote that " the moon is the author and framer of mortal bodies, so much so that some things expand or shrink as it waxes or wanes."

The periodicity of epileptic attacks was soon associated with the phases of the moon and the moon was eventually held responsible in part for this disease. Aretaeus, the Cappadocian, First Century A. D., summarizes the classical viewpoints on epilepsy when he says, " But also it (epilepsy) is reckoned as a disgraceful form of disease, for it is supposed that it is an infliction on persons who have sinned against the moon, and hence some have called it the Sacred Disease and that for more reasons than one, as from the greatness of the evil; or because the cure of it is not human but divine; or from the opinion that it proceeded from the entrance of a demon into the man; from some one, or all of these causes together, it has been called Sacred."

St. Jerome was among the few who tried to stem the mystical conceptions of the influence of the moon. He stated that lunatics were not really smitten by the moon but were believed to be so, through the subtlety of the demons, who by observing the seasons of the moon sought to bring an evil report against the creature that it might redound to the blasphemy of the Creator. This apparent dissociation of the moon from madness was common at this time. In the Old Testament madness was conceived of as a phenomenon kindred to a prophetic furor; those afflicted were considered sacrosanct. However, the mad men of the New Testament were not kings but common folk and their malady is attributed, not to a spirit from God, but to inferior deities or demons, entering into them.

From the writings of Paracelsus (1493-1541), mystic, alchemist and physician, can be gleaned the great wealth of astrological and mystical beliefs of the Middle Ages. With reference to the moon Paracelsus wrote a great deal, and in his interpretations he applied both his astrological and mystical concepts. His writings demonstrate clearly the true derivation of the word *lunacy* as signifying insanity. He states, "The 'spiritus vitae cerebri' of an insane person may be attracted towards the moon in the same manner as the needle of a compass is attracted towards the pole and such a person will, therefore, especially at the time of the new moon, when the attraction is strongest, grow worse, and begin to rave; and likewise the 'spiritus sensitivus' of a man who is weak and offers no resistance may be attracted towards the moon and be poisoned by its evil influence. The moon's influence is cold; and insane people have been called 'lunatics' because they were often injuriously affected by the moon whose influence acts upon the brain and stimulates the sexual passions, and causes injurious dreams and hallucinations."

Paracelsus then gives a list of medications for the treatment of insanity, hysteria and nervous diseases. These are chiefly plants which, when collected and administered under auspicious astrological circumstances, will bring about improvement or cure. Among these plants influenced by the moon are: "Helleborus niger," "Thymus majorana," etc. He also admits with the ancients that silver is the chief metal of the moon and when used in amulets is

helpful for cure. Even today certain silver compounds have the prefix "lunar."

Throughout the intervening years the association of the moon with insanity became so deeply rooted that the word lunacy was synonymous with the word insanity. It was taken up by poets and in Othello, for example, we find:

> "The moon, coming nearer earth than is her wont, makes men mad."

Or in Hamlet the following quotation:

> "Grating so harshly all his days of quiet with turbulent and dangerous lunacy."

Physicians and philosophers admitted that the wise regulated their daily lives in accordance with the planetary aspects formed by the moon to the other planets.

Though many consider that we have now entered upon an agnostic and ultra-scientific age, the early concepts of moon influence have by no means been lost. The term "moon-mad" can be frequently seen in our daily newspapers, especially when reference is made to the activities of pyromaniacs. In a recent article Thomas P. Brophy, Head of the Bureau of Fire Investigation of New York City, admitted that, during a period of several years, more incendiary fires occurred when the moon was full than at any other time, and on bright moon-light nights he and his deputies have found it expedient to be more alert than ever.

Whatever our beliefs may be, moon lore has left its imprint on our language and not only have we our own terms such as lunacy, moonstruck, and the like, but other languages also bear the mark of moon influence. In Germany the word Mondsucht is used to signify somnambulence and, at times lunacy. The French, particularly in their Bible, frequently use the term "lunatique." However, these last vestiges of moon lore are slowly being lost to us and the term "lunacy" has been succeeded by others such as insanity, alienation, mental disease; and even our mental institutions, within the last 50 years, have changed their names from lunatic asylums to insane asylums and later to state hospitals, thereby attempting to lift a suggestive stigma from those afflicted.

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NURSING EDUCATION.

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The evolution of the mental hospital is most interesting history; from the dreary dungeons, the almshouses, the custodial institutions to the modern hospital where the mentally ill are receiving scientific care is a fascinating story, although at times it is heartrending. It is gratifying to those who are devoting their lives to the care of the mentally ill to see the change in attitude toward this type of illness and to know that some hospitals consider mental aspects of disease and maintain a unit for psychiatry just as they have units for medicine, surgery, pediatrics and obstetrics. In these institutions student nurses have a period of practice in this special department as a definite requirement of their course of study.

It is the purpose of this paper to discuss the care of the mentally ill as a definite responsibility of the nursing profession and to show that nursing education is incomplete unless the mental and emotional aspects of illness are given due consideration. Nurses are not adequately prepared for the practice of their profession when they are not fitted to care for all phases of illness. How often the nurse fails to recognize mental symptoms and how often she may notice the symptoms without knowing how to interpret or treat them. Many failures in nursing are usually due to ignorance in caring for the mental and emotional disturbances of our patients.

We speak of mental nursing. When is nursing "mental nursing"? It is true, there are patients who are suffering from disturbances which are pronounced deviations from normal mental well being, but even then I would like to drop the term "mental nursing" and say "nursing the patient." We do not say "physical nursing." All sick people are mentally and physically impaired and they all need the care of a nurse who understands both aspects. We who are responsible for nursing education should see that the curriculum is of such a nature that the student is prepared to nurse the whole patient, not just one aspect of the illness.

The objectives of nursing education are threefold; first, to assist students in the development of habits and attitudes of mind which

are most likely to make for adequate personal adjustment and successful living in an ever-changing environment; second, to aid students in the attainment of a knowledge of the fundamental principles and the facts upon which all good nursing is built; third, to guide students in the acquisition of nursing techniques and skills, the necessary tools of those aspiring to care for the sick.

The well-equipped nurse of today and tomorrow must have some knowledge of human nature. She must appreciate the complexity of the human organism, and realize that it is a unit composed of physical and psychological elements. The education of the nurse must be of such a character that these two aspects are given due consideration. Throughout the entire program of nursing education emphasis should be placed on studying and understanding the patient as a unit. The graduate nurse should be prepared to give attention and care to all phases of human nature. Too many nurses of today are unprepared to deal with the mental and emotional problems with which they are confronted. Nursing education has been somewhat at fault because it has emphasized the physical factors of illness with little or no regard for the mental. Schools of nursing have taught techniques for physical care and treatment and the fundamental factors underlying them; they have taught prevention of physical illness and have succeeded in producing nurses who can recognize physical impairment, interpret its significance, administer curative measures and teach physical health. The schools of the past have not given sufficient attention to the mental and emotional aspects of health and sickness, and the same is true of many of the schools of today. The new curriculum prepared by a committee of the National League of Nursing Education is emphasizing mental health and stressing the importance of including such subjects as psychology, sociology and psychiatry as required courses of the nursing school program. With nursing education thus rounded out the nurse of the future will be concerned with the patient as a whole, not just his physical well being and improvement. The integrated personality is to be studied, so that the nurse will have a better understanding of her patients and will be prepared to give them more intelligent care. A more thorough knowledge of the complicated and the intricate mechanism of human nature should aid the nurse in caring for the sick and in teaching health.

To consider the psychological factors as well as the physical in planning the curriculum of a school of nursing is to depart from the traditional and historical trend in nursing and nursing education. It will be necessary in the future for all student nurses to study mental diseases and disorders and have periods of practice in the mental hospitals, because it will be through such contacts that they will have the best opportunity of studying human nature. It is an accepted fact that studying the reactions of a mental patient is studying human behavior under a microscope.

The question that arises is what system of education will give the student the opportunity of becoming the kind of nurse who will recognize mental symptoms as well as physical, who will properly interpret and report such symptoms, who will have the ability to administer the prescribed treatment, and who can teach mental as well as physical health. At the present time there is a strong tendency in nursing education toward a combination of college and hospital resources. It is thought by many that such an arrangement will produce a nurse with a better social outlook, a better understanding of human nature and a personality greatly enriched by college experience. There is, however, and will be for many years to come, the hospital school of nursing which is owned, controlled and managed by the hospital organization. In many schools of this type the curriculum is being amplified and greatly improved by adding subject matter which will assist the student in getting a broader knowledge of people and the environment in which they live. More scientific methods of teaching have been introduced in order that learning may be facilitated.

The product of our schools must be a woman equipped to do nursing, not just physical nursing such as medical, surgical, obstetric or pediatric nursing, or just psychiatric nursing. No, it is nursing in all its aspects in which we are interested. She must understand the human organism, its growth, its relationships in a physical world, and she must know something of those factors which promote health and prevent disease. A woman who has a psychological and sociological as well as a biological background and with experience in caring for all types of human impairment will be the best prepared to meet the demands of the nursing profession. Far too long the general hospital school of nursing has emphasized physical care as the most important factor in caring for the sick,

and the psychiatric hospital has thought that psychiatric nurses could best be trained in their own institutions without any assistance from the general hospital school of nursing. It must not be forgotten that in preparing the nurse, whether in the college school of nursing or in the hospital school of nursing, the education both in content and method must be of college level. The school has a very definite responsibility both to the community and to the student who is seeking nursing education.

In order to meet State Board requirements the mental hospital school of nursing has had affiliations with the general hospital and in a relatively few instances the general hospital has had affiliations with the mental hospital. This is a beginning, but all nurses should have the soundest and broadest type of education and a thorough knowledge of human nature. The best education for all nurses is a program that will fit them for nursing the whole patient and teaching health in all its aspects. Both institutions, the general and the special, should contribute to the education of the nurse. It would seem that the ideal plan would be one where the general and special hospital cooperate with each other. The student would receive her basic education in the former and go to the latter for knowledge of and experience in caring for the acute, chronic and convalescing types of mental illness.

The mental hospital has always been jealous of its school, and rightfully so, because it has contributed greatly to the care of the patients. There is no doubt that in those hospitals where schools of nursing are conducted the nursing of the patient is of a much higher standard than in hospitals where there are no schools. A school of nursing raises the morale of the whole organization. The nursing profession, however, has always questioned the advisability of the mental hospital conducting a school of nursing, even though the affiliations were adequate so that the graduate would meet all the State Board requirements and be eligible for state registration. Some mental hospitals have advocated a course without affiliations, which leads to a diploma of "psychiatric nurse," "qualified nurse" or "certified nurse." Such a course is much inferior to the one which has affiliations and should not be encouraged. The candidates for such a course usually are young women who cannot qualify for the course leading to state registration, and who may not have the ambition to study for three years in preparation for the diploma

of graduate nurse. Either reason would indicate that the applicants were not up to the standard in intelligence and personality desired for a psychiatric nurse and would certainly not be the best type of person for the mentally ill.

In a discussion of courses in mental hospital schools of nursing without affiliations, Dr. George H. Stevenson says, " It is at direct variance with accepted standards for professional training inasmuch as specialization should follow the general training. An analogy in our profession would be the training of psychiatric physicians or tuberculosis physicians, that is, giving physicians the specialty without the general scientific background. The same principle applies in the teaching profession; the teaching specialist must first have the general training before qualifying for his specialty. It would therefore appear that the training of so called " psychiatric nurses " is pedagogically unsound, and fails to give our patients the care to which they are entitled." Every one will agree that this same reasoning may be applied to the education of the nurse.

If the mental hospital does not train the " psychiatric nurse," and if it does not have the three-year-course of nursing affiliations, what can it do to obtain qualified personnel? In no other branch of nursing is there greater need for high ideals and standards. Since a school of nursing in a mental hospital always raises the standard of care given to the patients, every effort should be made to have some educational program. The answer is a school for graduate and affiliating students. The special hospital may become the psychiatric department of the general hospital. The basic education of the nurse would be given in the general hospital and in the second and third years students would go to the mental hospital for experience in caring for patients with mental illness. The well-prepared student of the general hospital can do much in raising the standard of care given to the mental patient, and the psychiatric hospital can do equally as much in assisting the nurse in becoming better prepared for general nursing.

The mental aspect of nursing should be given attention in the very beginning of the nursing education and continue throughout the entire course of study. The curriculum should include general psychology, to be given during the first term of the freshman year if it has not been an entrance requirement. There should be short courses in study and work techniques, in personality develop-

ment and in adjustment mechanisms. Such courses will help the student in acquiring efficient habits of work and study and in building up a wholesome personality. A course in child development and in the psychology of deviate behavior will help the student to understand her patients better and prepare her to assist more intelligently in the solution of their behavior difficulties. These required courses should be correlated with practice and all case studies should include a record of the patient's mental problems and treatments, as well as a record of symptoms and treatment of the physical aspects of disease.

The time is not far distant when all members of the general hospital school faculty must be prepared to direct the students in their study of the mental aspects of illness, and teach them how to care for mental as well as physical symptoms. Nursing educators are beginning to realize that schools of nursing must consider the patient as a personality and the teaching plan must give attention to all the elements making up that personality. In addition to this broader concept of patient care, the faculty is realizing that they have a responsibility for the mental health of the student body. The personality development of the students and the solution of personality difficulties are of great concern to the teaching staff of the good school of nursing. The medical and nursing staff of the mental hospital can be of inestimable assistance to the members of the general hospital faculty in helping them become better prepared for psychiatric nursing and mental hygiene. A psychiatric consultant is always a valuable asset to any organization where groups of people are working together, and this is especially true in a school of nursing.

The first step in the organization of an education program in a mental hospital is the formation of a committee on psychiatric nursing and mental hygiene. The membership would include representatives of the general and mental hospitals, an educator, a public health nurse who knows the needs of nurses working in the homes and representatives from the boards of both institutions. The function of this committee would be to formulate policies and to promote relationships between the two organizations so that both would contribute their best towards the education of the nurse. A committee to which problems may be taken where there is opportunity for free discussion is always of mutual benefit.

The mental hospital should make a definite plan for the nursing education program. It should make an effort to have the same standards in all that pertains to the home and social life of the student as those prevailing in the general hospitals from which they receive students. The following may serve as a guide for the mental hospital faculty planning for a graduate and affiliating school:

1. An educational committee should be appointed which will make the policies governing the school. It will be concerned with the content of the whole curriculum, with the subject matter of the different courses, the methods of teaching, the selection of wards for practice, the appointment of faculty and record keeping. Every factor pertaining to the physical and mental health and personality of the student should be of interest to it.

The membership of this committee should include the superintendent of the mental hospital, the director of the nursing service, the educational director, a doctor to represent the medical staff, a nurse to represent the graduate nurse staff, the chief occupational therapist and the chief social worker.

Meetings should be held at least every third week.

2. A budget for the necessary expenses of the school should be a separate item in the general nursing budget of the hospital. The money usually given as allowance to students should be allocated to the school of nursing budget and be used for providing additional and better qualified instructors, books and teaching equipment.

3. The mental hospital should provide a faculty comparable in every way to the faculty of the general hospital school of nursing. The members of the mental hospital faculty should be given the same social and professional status as that given to the faculty in the general hospital.

4. The educational program should be planned with great care and administered according to college standards.

5. Teaching equipment should include lecture and conference rooms, laboratories with adequate equipment and material for the teaching of the various therapies used in the hospital.

6. A reference library should be provided which contains books on general medicine and nursing. Special attention should be given to books on psychology, psychiatry and allied subjects. The magazines, journals and periodicals should be general and special, professional and non-professional. The library should be part of the educational unit and a place conducive to study.

7. The clinical facilities should be organized so that the best possible practice will be available for the students.

The wards should be carefully selected so that the experience of the students will be varied and include the more important types of mental illness. They should be well equipped for good patient care and should be under the supervision of registered graduate nurses specially prepared for mental nursing and teaching.

Wards for men should be included, and under the same type of management as the wards for women. Orderlies should assist the nurses on the wards, as they do in the general hospital.

Students should have experience in all the different therapies used in the treatment of the mentally ill. They should have practice in the special departments as well as practice in the various therapies during their ward assignments.

Practice in the social service department and in the out-patient clinic should be provided.

8. The hours of class and field practice should not exceed 48 hours per week, and when students are in special departments their time on duty should be the same as that of the personnel of that service. A whole day off duty each week should be given to the students when on ward duty.

9. A physician of the mental hospital should be in charge of the health of the students. Emphasis should be placed on personal mental hygiene and every opportunity taken to teach mental health.

10. The mental hospital should provide adequate living quarters for the faculty and students of the school. If it is not possible to have a separate building, then one wing or a section of the nurses home should be set aside for their exclusive use.

The residence should be in charge of a capable and experienced director who has an understanding of young people and is interested in making their home life wholesome and congenial.

A program for recreation and social activities should be provided.

11. The school should have a record system of student attainment, efficiency and personality, which is comparable to the record system used in the general hospital school of nursing.

The care of the mentally ill and the prevention of mental illness are two important problems confronting society at the present time. A satisfactory solution involves hospitals, doctors, nurses, therapists of various types, social workers and other personnel. The nurse occupies a most strategic position for she is with the patient the full twenty-four hours and works in the hospital and in the community. She not only assists in the treatment of the mentally ill, but aids in the promotion of mental health and in the prevention of mental illness. Every effort should be made by both general and mental hospitals to cooperate in organizing a system of education which will offer the best kind of preparation for nursing in all its varied aspects. Each institution should contribute that for which it is best fitted. The general hospital should teach fundamental principles and provide practice in general nursing, while the mental hospital should teach psychiatry and allied subjects and provide practice in the care of the mentally ill.

I am confident that if all general and mental hospitals in a state would coordinate their resources the future nurse would be more adequately prepared to serve the public. The nursing care in both the general and mental hospital would be of a higher standard and the public health nurse would be better equipped for nursing and promoting mental health in the community.

DISCUSSION.

DR. GEORGE H. STEVENSON (London, Ont., Canada).—The Association and the Committee on Psychiatric Nursing is very much indebted to Miss Kennedy for coming today to present this interesting and very challenging paper. Her prominent place in the nursing world as Chairman of the National League of Nursing Education's Committee on Psychiatric Nursing and Mental Hygiene is some indication of the attitude taken by the official nursing organizations. She presents to us the thesis that there is no natural division of physical and psychiatric nursing. At first glance, this appears a revolutionary statement, interested as we are in our attempts to see that mental patients are properly nursed, and interested as we are in trying to persuade nurses generally that those under our care are actually sick and require nursing.

We have come a long way in recent years in both of these developments. As psychiatrists we no longer differentiate physical and mental, but are interested in the individual as a whole, the sick person. We can, therefore, commend strongly Miss Kennedy's attitude and the recognition of the nursing profession generally that the mentally ill are ill, acutely ill, even deliriously ill, and are entitled to the best nursing care.

The extent of this recognition may be indicated by the results of a survey conducted by our Committee on Psychiatric Nursing during the past few months, revealing that 288 general hospital training schools in the United States and Canada give actual experience in this field, either by affiliation with a mental hospital, or by a psychiatric ward or division in the home school. Compare these figures with the very few schools that gave such training even five years ago.

If we accept this general thesis, the practical means by which nursing education is to be developed must receive hard thinking. Undergraduate schools in mental hospitals sprang up for the same reasons as in general hospitals, although somewhat later. Those of us who have seen the development of such schools well appreciate the great value they have been and the better care our patients have received as a result, especially our women patients, because curiously enough some of us did not realize that sick men required just as good care.

Neglected as we were by nurses trained in general hospital schools, our own training schools had every justification. Miss Kennedy suggests that such schools be now discontinued. This makes a very distinct problem for

us, because of our dual responsibility as hospital administrators on the one hand, and on the other, nominally at least as heads of our schools of nursing.

It certainly is our duty to see that our patients are well nursed, but it is equally our duty to see that our schools of nursing, if continued, are adequate. We have no right to operate such schools if they are not giving adequate education to the nurse, or if they are exploiting the nurse, or serving as a means of getting cheap labor. If the apprenticeship system is to continue for a time, at least, we expect service from our nurses. Such service should be incidental to the business of training her to give adequate service after graduation.

Many mental hospitals are discontinuing undergraduate schools. The reasons for such actions vary. If a hospital cannot give adequate training even with a general hospital affiliation, it has no right to continue; however, most of the schools which have discontinued have done so in favor of affiliate and postgraduate training, because of the belief of those in charge of them that the time has come for adoption of the views expressed by Miss Kennedy in her paper.

The Committee on Psychiatric Nursing has also ascertained during the last year that there are 60 affiliate courses, and 33 postgraduate courses of psychiatric nursing offered in the United States and Canada. Only 46 undergraduate schools accredited by this Association are still operating, compared with over 60 as recently as two years ago.

We are witnessing a very new and definite trend in nursing education in mental hospital schools of nursing. If we are to discontinue our under graduate schools, there are certain questions that we will want to ask Miss Kennedy and ask ourselves. What assurance have we that an adequate supply of nurses will be available for our ward needs? What salaries are to be paid, having in mind that most of our hospitals are operated by governmental agencies? How far will general hospitals go in insisting that their nurses receive psychiatric training? As I mentioned, 288 schools and general hospitals are now offering that training, but that is a very small fraction of all the general hospital schools operating in these countries.

Obviously, this change cannot be made suddenly. It does appear to be in progress, however, judging from the figures quoted. We shall probably need to have schools in some psychiatric hospitals for some time yet to supply our needs, at least until all nurses are definitely trained and psychiatric nurses are available and willing to enter the service of the mental hospitals.

The Committee on Psychiatric Nursing does not advise or recommend the discontinuance of training schools in mental hospitals until such time as each hospital can be assured of satisfactory answers to the foregoing questions.

As a result of the survey of certain schools of nursing, accredited by the Association made by Miss Harriet Bailey, and reported in the *American Journal of Nursing* and in THE AMERICAN JOURNAL OF PSYCHIATRY in January of this year, the need of looking to our standards has been forcibly brought home to us, although Miss Bailey did not go quite so far in her recommendations as Miss Kennedy has suggested in her paper, but the problem is there and it cannot be ignored.

THE IRRITATIVE TREATMENT OF SCHIZOPHRENIA.

Review of 20 Cases.

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Introduction.

The treatments devised in the past for schizophrenia are as numerous as the concepts of its etiology and both are constantly changing with the times. It is the purpose of this paper to present for consideration a recent trend in its treatment, approaching the problem from the organic or physiologic aspects. It is well at this point to state summarily that many workers [1] have determined that there are changes in the metabolic and chemical processes in schizophrenia. These changes, although minimal, do indicate that there exists a type of sluggishness, as it were, in the bodily economy of schizophrenic patients. This sluggishness may be translated theoretically in terms of lowered metabolic activity of the brain. It is possible to theorize further and state that there may be a functional barrier to facile absorption or assimilation of nutritive elements set up in the brain of such a patient. The mental changes resulting from this barrier would become proportionately irreversible as the disease progresses. A therapeutic routine directed against this functional barrier before actual irreversible changes have occurred may reinstate the normal nutritive mechanisms thus providing an unblocked pathway for normal mental functions.

Theoretically then, we may state that the following therapy is in the nature of an irritative or stimulative means to combat this blocking. According to v. Meduna [2] the irritative therapy of schizophrenia involves the setting up of a temporary epileptic state by the use of convulsive drugs. This is based upon the study of a large number of schizophrenic and epileptic patients, and the noteworthy finding of a very infrequent concurrence of the two conditions; in other words, a type of biologic antagonism similar to the

one noted between febrile conditions and general paresis. Whether or not the actual motor reactions occurring with the therapy are necessary for improvement or remission cannot as yet be stated. Among the 110 patients treated by v. Meduna those who reacted readily with convulsions showed the most favorable and the earliest remissive changes.

The procedure described by v. Meduna was modified to some extent and carried out in twenty cases admitted to the psychiatric service of the Buffalo City Hospital, during the routine 30-day observation period.

Method and Rationale.

Part A.—The diagnosis is established as soon as possible and the patient's family contacted to explain and receive consent for the therapy. Complete laboratory work is done, with the blood chemistry values and complete urine determinations once weekly. The patient is placed on standard alkaline diet arranged by the dietitian. The diet must include adequate vitamins, calories and bulk. He is given 1.30 gm. sodium bicarbonate three times a day. The urine is tested daily for alkalinity to litmus during the first five days; thereafter twice weekly for the extent of the treatment. Fluid intake is set at a minimum of 2 liters per day. No sedatives of any type are given during the period of treatment.

Part B.—The two convulsant drugs employed are camphor in the 25 per cent oily solution given intramuscularly, and metrazol * given in 10 per cent aqueous solution intravenously. A freshly prepared sterile solution of camphor is injected twice daily only after the urines have been alkaline for two days. The initial dose is 16.0 cc. (4.0 gm.) and the subsequent doses are increased at the rate of 4.0 cc. (1.0 gm.) per day. When metrazol is used the injections are given once every other day starting at 5.0 cc. (0.5 gm.) and subsequent doses are increased at the rate of 1.0 cc. (0.1 gm.) each injection. When camphor is employed and convulsions occur at any given dose the injection is omitted the following day, and the next dose is the same as the convulsing dose. If convulsions do not occur after four injections, three or four days are allowed

* Pentamethylenetetrazol.

to elapse before the injections are resumed, and then at an increase of 4.0 to 6.0 cc. The maximum dose of camphor is set at 56.0 cc. (14.0 gm.). In the case of metrazol the doses are increased as stated whether or not convulsions occur. The maximum dose is set at 16.0 cc. (1.6 gm.).

When convulsions occur, the patient receives the routine (immediate) care usually given epileptic patients excluding the use of sedatives. In the case of camphor, convulsions were found to occur from 15 minutes to 3 hours after the injection, and as high as 6 individual convulsions were noted. When metrazol is used, only a single convulsion immediately ensues and prompt attention must be given. The dosages suggested above are flexible. When convulsions resulting from any given dose are unusually severe or prolonged, the subsequent doses must not be increased as rapidly as stated. The individual reaction to a given dose is the sole determinant of subsequent doses.

The following observations are charted: (a) Occurrence and description of convulsions as to number, severity and whether they are partial or general. The phases are noted as well as the nature of the post-convulsive state. (b) Occurrence of irritability when annoyed or bothered by others, as well as coöperative attitude. (c) State of activity: whether or not accessory phenomena are intensified and muscular and impulsive activity are increased. The patient is frequently interviewed and any mental changes noted.

Due to the short time during which the patient is available for study, adequate opportunity is not given for a long and minutely detailed study and almost a dramatic result is necessary to demonstrate the efficacy of the treatment. It is seen, therefore, that a rapid establishment on an irritative threshold, and one without danger to the patient is of ultimate importance. This threshold may logically be reached by the administration of alkali to reach as thorough a degree of alkalinization as possible. It is known that alkalinization is tetanic or convulsive in itself.[3] Likewise the administration of an adequate amount of fluid assists in the maintenance of an irritative background in the central nervous system. These principles are well known in their converse relations in the more or less routine treatment of epilepsy, *i. e.*, ketogenic diets and dehydration.

As to the dosage of camphor and its tolerance-variations, it was determined by v. Meduna that convulsive doses vary not only in different patients but also in the same patient at different times. It was observed in this study that camphor does not always produce convulsions but its therapeutic value is still present as will be shown later.

Without going into great detail regarding the actions of the drugs employed, the following clinical observations have been noted in this work. With metrazol, an immediate, typical epileptiform manifestation appeared, simulating true epilepsy in all its well-known phases, including vivid auræ and automatisms. At the initial stage of the convulsion there was always a tonic yawning movement which was utilized to insert a thick gauze pad to prevent tongue-biting. When camphor was employed, the reactions were manifested over a longer period of time. Single or multiple convulsions occurred after a much longer interval and usually without warning. Whether or not convulsions occurred, there was noted what may be called a deliriform or twilight state somewhat similar to that of an individual mildly under the influence of alcohol or cannabis. The patient would walk about as though dazed; reactivity to vivid and painful hallucinations chiefly of the somatic type was frequently noted—different in many ways from the reactivity and the content of the hallucinations noted before treatment was started. This difference was noticeably significant in that the patients registered concern and anxiety about the hallucinations. It was not infrequently observed that impulsive activities were increased, and the patient would become destructive and aggressive. In many instances, the only descriptive term possible was that the patient was "different." These reactions to camphor and somewhat less to metrazol remained for as long as ten days after the last injection. The patients would state, when they returned a month or more after release, that they recalled only fragments of what went on while they were under treatment. They would recall the intense auræ and how terrified they felt "just before going to sleep" (onset of the tonic phase of the seizure). Petit mal types of seizures were frequently observed with metrazol and similarly, but with much less frequency, with camphor. In these cases the patient underwent a restless type of gross twitching for one or two seconds and this

was immediately followed by a period of intensely vivid hallucinatory reactions, lasting for as long as two hours. It was often extremely difficult to persuade the patient to verbalize these reactions, but the staring, fixed expressions of terror or pleasure left no doubt as to what was occurring.

The immediate obnoxious effects of camphor, and to a much lesser extent with metrazol, were nausea, emesis, a mild form of ataxia and infrequent complaints of malaise and paresthesia-like pains in the extremities. The only complications noted in this series were two cases of bilateral subcutaneous abscesses in the gluteal region, resulting from the camphor injections, two cases of moderately severe tongue lacerations, and one case of a dislocated mandible due to the tonic yawn with a metrazol convulsion. v. Meduna reported, in addition to these, only one case of a dislocated shoulder due to a severe convulsive reaction.

The contraindications, as listed by v. Meduna, are: (a) failing or decompensating cardiovascular system, (b) any acute febrile condition, (c) menstruation. To these we added: (d) severe anemia or cachexia, (e) any abnormality of the blood or urinary constituents, and (f) previous history of severe cranial injury with subsequent unconsciousness.

Typical Case Reports.

17. I. F. Slavonic female. In the six years before the present admission, this patient has had untoward, purposeless, impulsive reactivity to more or less well-defined erotic delusions. She has had three previous admissions to the psychiatric service followed by two admissions to the state hospital with paroles and discharges each time. The last discharge from the state hospital was about six months before her present admission to Buffalo City Hospital. During this interval, the patient gradually reverted to the same behavior as described above. She became less and less efficient in her home until she was a hindrance to ordinary domestic routine. On her present or fourth admission, she was brought in by the police who found her in a grocery store, where she had been sitting for several hours, grinning foolishly and giving no answers to questions. In the hospital a considerable amount of emotional deterioration was noted together with the other signs previously mentioned.

Camphor was administered from the fifth day after admission, and there resulted a continuous, confused, deliriform state punctuated by rather severe convulsions. On examination at the end of her term, she was quiet, pleasant and well-behaved. There were no delusional manifestations and she was rather cooperative and helpful. The patient was regarded as much improved

TABLE I.

Case: Name and No.	Age, decade.	Marital state.	Occupation.	Duration, months. (+ −)	Apparent class.	Characteristics as to intellect, impulses, and accessory symptoms. Deterioration. (+ −)
J. S. 8.....	2	Single	..None	1(−)	Par.	Defective, silly, diabolic. (+)
F. M. 9.....	3	Married	.Housework	24(+)	Par.-Cat.	Average, reactive, aggressive, religious, erotic. (+)
A. O.'B. 10..	3	Single	..Packer	2(+)	Cat.-Par.	Average, mute, negativistic, sl. erotic. (−)
N. W. 11....	2	Single	..Student	4(+)	Cat.	Average, mute, posturings, occasional outbursts. (+)
L. M. 13....	4	Married	.None	36(+)	Par.-Simple	Average, uncooperative, frequently active or preoccupied with all types. (+)
P. W. 14....	3	Single	..None	24(+)	Simple-Par.	Average, evasive, preoccupied, persecutory. (−)
C. S. 15.....	3	Single	..None	36(+)	Par.	Average, reactive, silly, mechanical and religious. (+)
G. K. 16....	3	Single	..Domestic	1(+)	Cat.-Hebe.	Average, very active, intense hallucinations of all types. (+)
I. F. 17.....	4	Single	..Domestic	72(−)	Par.	Average, silly, erotic. (+)
A. S. 19.....	4	Married	.Housework	6(+)	Par.	High, aggressive, overbearing, religious, persecutory. (+)
G. S. 20.....	3	Single	..Electroplater ..	1(−)	Cat.-Hebe.	High, talkative, silly, reactive, mechanical, erotic. (+)
C. W. 21....	4	Single	..Teacher	1(−)	Par.	High, active, religious, mechanical. (+)
E. Z. 22.....	3	Single	..Mechanic	12(+)	Simple-Par.	Average, apathetic seclusive, somatic. (+)
W. M. 23....	3	Single	..Mechanic	12(−)	Cat.-Par.	Average, active, furor, sl. erotic persecutory. (+)
E. S. 24.....	3	Single	..None	1(+)	Par.	Low, silly, incontinent, aggressive, religious, erotic. (+)
F. W. 25....	3	Single	..Student	18(+)	Cat.-Par.	High, active, aggressive, religious, grandiose. (+)
G. H. 26....	4	Married	.Disposal of animals	1(−)	Par.	High, active, silly, incontinent, religious, persecutory. (−)
I. C. 27.....	4	Married	.Teacher	1(−)	Par.	High, active, silly, incontinent, religious, mechanical. (−)
F. D. 28.....		Single	..None	7(+)	Unclassified	Average, silly, reactive, religious, persecutory. (+)
W. G. 29....	3	Married	.Engineer	2(+)	Par.	High, aggressive, religious. (−)

TABLE II.

Case: Name and No.	No. days alkaline urine.	Grams. Camphor—C. Metrazol—M.	No. convulsions. Grand mal—G. Petit mal—P.	Changes during during therapy.	Days of treatment.
J. S. 8	0	C – 97.50	9–G	Gain in weight, became quieter, deliriform.	21
F. M. 9	0	C –105.00	0	Lost weight, became very active, and aggressive.	30
A. O'B. 10	21	C – 93.50	3–G 3–P	Gained weight, at times deliriform action.	21
N. W. 11	22	C –178.00	10–G	Gained weight, deliriform, took interest in surroundings.	30
L. M. 13	0	C –190.00	0	More irritable, deliriform, confused.	28
P. W. 14	0	C –229.25	10–G	Lost weight, became irritable and aggressive, somatic phenomena.	29
C. S. 15	20	C –127.50	10–G	Lost weight, became apathetic and confused.	29
G. K. 16	20	C –241.75 M – 12.50	17–G 6–P	Became quieter and apathetic, confused.	58
I. F. 17	14	C –345.25	6–G 1–P	Became irritable and confused; lost weight.	34
A. S. 19	30	C –400	0	Quieter, silly, confused.	30
G. S. 20	0	M – 9.60	8–G 3–P	Gained weight, quieter, sl. deliriform.	28
C. W. 21	10	M – 13.60	8–G 3–P	Quieter, sl. deliriform.	27
E. Z. 22	10	C –345.00	4–G	Irritable, aggressive, deliriform.	29
W. M. 23	4	C –221.50	10–G 2–P	Quieter, apathetic, confused.	27
E. S. 24	0	M – 13.60	9–G 5–P	No changes.	25
F. W. 25	5	M – 18.90	14–G 3–P	Quieter, confused, sl. deliriform.	47
G. H. 26	9	M – 15.5	9–G 5–P	Quieter, gained weight, confused.	36
I. C. 27	7	C – 5.00 M – 8.00	8–G 1–P	Quieter, sl. confused.	16
F. D. 28	6	M – 13.0	14–G 2–P	Agitated, confused.	29
W. G. 29	8	M – 7.50	9–G 1–P	Quieter, sl. deliriform, confused.	25

TABLE III.

RESULTS.

Case: Name and No.	Immediate results.	Results after two or three months.
J. S. 8	Somewhat improved, much more cooperative, not impulsive, defective judgment.	State hospital—developed true catatonic state.
F. M. 9	Unimproved—unchanged.	State hospital, much more cooperative and helpful. Occasional outbursts.
A. O'B. 10	Cooperative, quiet, no hallucinatory trends. Much improved and released.	Good social adjustment. Employed.
N. W. 11	Speech retardation and confusion. Cooperative and helpful. Good planning ability. Much improved. Released.	Retardation of speech. Still cooperative.
L. M. 13	Quiet, cooperative, no delusional trends, no planning ability, somewhat improved. Released.	First month worked, was sociable and helpful, then again argumentative and irritable. Recommitted.
P. W. 14	Confused, deliriform reaction on release.	Very well adjusted socially, behavior extravert employed. Much improved.
C. S. 15	Alert, cooperative, no accessory symptoms. Much improved. Released.	Employed. Well adjusted at home.
G. K. 16	Cooperative, interested in family, no hallucinatory or delusional trends. Much improved. Released.	Has not been heard from.
I. F. 17	Quiet, pleasant, well-behaved, no accessory symptoms. Much improved. Released.	Well adjusted socially. Employed.
A. S. 19	Normal concern over domestic affairs. No delusional trends, cooperative, friendly. Much improved. Released.	Rapid relapse to original condition. Committed to state hospital.
G. S. 20	Relevant and coherent speech, fair planning ability, immature emotional attachments. Much improved, released. No accessory symptoms.	Sudden relapse to original disturbed state.
C. W. 21	Quiet and cooperative, no accessory symptoms. No insight nor plans. Much improved. Released.	Alert, stable, considerable insight, well-adjusted socially. Ready to work.
E. Z. 22	Apathetic, confused, released under camphor.	Alert and spontaneous. Eager to work. Well adjusted at home. Much improved.
W. M. 23	Retarded speech, cooperative, helpful, much improved.	Well-adjusted socially, friendly, had conclusive plans regarding going to work.
E. S. 24	Condition unchanged. Unimproved.	Not contacted as yet.
F. W. 25	No accessory symptoms, confused, cooperative and helpful. Much improved. Released.	Friendly, well-adjusted, considerable insight. Planning to carry on studies.
G. H. 26	Confused, no accessory symptoms, cooperative and helpful. Much improved.	Alert, spontaneous and rational. Some insight, well-adjusted socially. Eager to work.
I. C. 27	No accessory symptoms, speech rational. Superficial and evasive. Much improved and released.	Well adjusted socially, considerable insight, resumed active work.
F. D. 28	No accessory symptoms, speech coherent, emotionally unstable and deficient judgment. Unimproved but released.	Rapid relapse, is being treated again.
W. G. 29	Some retardation of speech, quiet and cooperative. No accessory symptoms. Much improved. Released.	Well-adjusted socially. Alert and spontaneous. Eager to resume work.

and was released. After conversing with her, her people were only too glad to take the patient home, whereas previously, they had insisted on prompt hospitalization.

She was seen one, and two months after release. She was dressed well; her appearance was improved by the addition of partial dentures, and she talked eagerly and in a straight-forward manner. There were no accessory symptoms and she had been usefully occupied at home and in the family's store. Three months after release the patient telephoned and stated that she was feeling so well, that she felt it unnecessary to fill her appointment. Besides, due to her work, she did not have time for it.

27. I. C. American male. This patient had a residual atrophy of the right leg and left thumb since an attack of poliomyelitis in childhood. He had been a high school instructor in mathematics for several years before admission. For two months before admission he had been working very strenuously, organizing a teachers' union, lecturing and diligently working for a Ph. D. He began to complain of fatigue about two weeks before admission, at which time he remarked that he had done an injustice to his students. Instead of helping them just before mid-year examinations, he stayed at home to rest. He was at home for about a week and then returned to work. Three days before admission he fainted while teaching, and was brought home from school. On the following day he acted very queerly toward his family, expressing ideas of suicide, and he appeared very agitated. Early in the morning of the day of admission he awoke and quoted passages from the Scriptures mingled with nursery rhymes. He also suffered from persecutory hallucinations and held arguments with his imaginary tormentors, later becoming threatening and aggressive. He executed various purposeless and protective manœuvers. After admission, these actions continued. He attempted frequently to void in the corners of his room. The hallucinatory manifestations continued.

He was placed on metrazol therapy on the third day and responded with violent convulsions with each injection. After the second injection he displayed no further hallucinatory reactions and was well-behaved. He walked about the ward with a dazed expression; he tried to read the newspapers but it was apparent that he had difficulty in comprehension. Examination at the end of his term brought out no accessory symptoms, and his speech was, for the most part rational in all fields. He was, however, superficial and evasive regarding his hallucinatory and disturbed period. He was amenable to suggestions as to his future. He was regarded as much improved and was released.

It was learned from the patient's family physician that he had not only adjusted well at home, but that he had returned to active work in school. He did not return to the out-patient department because he felt ashamed of being regarded as a "former mental patient."

Two interesting points may be mentioned about this patient: his willingness to verbalize his sensations while receiving the injections and his interest in his condition after release. Regarding the first point, he would give the following description: at first, he would have a penetrating sensation of an

odor similar to ether, which seemed to pervade his entire body; then he would experience a buzzing in his ears, and he felt as though he swam in the air; this was followed by a feeling of being violently tossed about, in the midst of which the tonic phase of the convulsion ensued. This sequence was repeated with each injection. As to the second point, the patient secured a copy of his discharge record from the hospital, and went to the library to look up for himself what the term "schizophrenia" meant. When he found out, he went to his family physician and argued with the latter so logically about this question that the physician stated in an informal conference, that it was hard for him to believe the patient was ever afflicted with a mental illness.

29. W. G. Teutonic male. The patient was a civil engineer who had worked hard, supporting himself through his school years and had readily obtained employment after graduation. About two months before admission, he obtained an advanced and responsible position which necessitated temporary separation from his family. The history of the onset of his condition was unclear. All that his family could find out was that the patient had insisted on going to church in his pajamas and that when placed in a nearby hospital he became so unmanageable that his employers had to bring him back to Buffalo. He spent about one week in a private sanatorium in Buffalo, and after several escapes through the window in response to "voices of his school-mates," he was admitted to the Buffalo City Hospital. On the ward he was aggressive, striking at nurses and attendants. He frequently stood by the window, staring at the sky for long intervals, a worshipful expression on his face. Upon questioning, he would give long, irrelevant philosophical and religious monologues.

He was placed on metrazol therapy, and responded with severe convulsions. With the first convulsion, he suffered a dislocated mandible. On subsequent injections this was prevented by inserting the tongue-pad before administration and holding his jaw firmly closed during the tonic phase. After the second injection he became more cooperative. With subsequent injections he ceased to stare out of the window and was somewhat helpful about the ward. Gradually his conversation became more relevant, although he could not understand why he was given the injections and why he had to be in the hospital. Examination at the end of his term revealed no delusional trends; he had only fragmentary recollection of his conduct on the ward. His responses, although relevant, were slow and lacked spontaneity. He displayed a meaningless, superficial smile and his comprehension appeared slow. He stated that just before he came to the hospital, he had felt that his mind was clear and that he felt like "acting as though he were a child." He could not elucidate this point. He was regarded as much improved and was released.

He was seen in the out-patient department three weeks after release. He was well-dressed, carefully groomed and greeted the writer in a very friendly fashion. He spoke alertly, spontaneously and in a straight-forward manner. Although he could recall but very few incidents of his hospital period, he had been informed of his actions by his wife, and he was very grateful. He gave a concise story of his life, and how hard he had had to work on his job. He

said that he had had to work all day and study until late at night on the engineering theories involved in his project. He had had no vacation for ten years preceding this illness. He stated that, looking back, he could feel this illness "coming on" for six months preceding admission. He felt himself getting increasingly restless and afraid he would lose his position; he would find himself suspecting his subordinates of trying to make the work difficult for him—all of which he evaluated properly as imaginatory phenomena. He eagerly discussed plans for the future with especial reference to vocational and recreational activities. Two weeks later, he wrote a friendly, coherent letter, stating that he felt very well and had obtained his former position. He asked that we advise him more specifically as to hours of rest and recreation.

19. A. S. Teutonic female. For seven years before admission, the patient had been undergoing personality changes. She became quarrelsome, domineering and irritable. She flew into a rage if her husband so much as drank a single glass of beer. (He was not an alcoholic.) She had threatened to leave him several times for no apparent reason. She became involved in many religious cults, studying one after another. She memorized and quoted lengthy passages from the Bible to friends, neighbors and family. She continually harped on the subject of "saving" everybody. Her answer to all financial and domestic emergencies was that the Lord would help her get along. She incurred many purposeless debts and became angered if called to task for them. During several days before admission the patient became hopelessly unmanageable. She went to church and loudly berated the minister in front of the congregation, and then went home and threatened the children, whence she was brought to the hospital. On the ward she displayed an angry, lordly air and denounced everyone connected with her commitment. A religious, delusional trend was apparent and an uncooperative, noisy attitude characterized her behavior.

Camphor therapy was begun on the eleventh day after admission; she was given large doses without any convulsive response. However, a confused, deliriform state ensued in which the patient complained of many somatic hallucinations. The domineering character changed to one of silly emotional actions at times mingled with destructive or combative tendencies. Near the end of her term, the therapy was stopped because of the development of bilateral subcutaneous abscesses in the gluteal region. With proper surgical procedure, these subsided. Meanwhile, the patient became much clearer mentally; she began to display a normal emotional concern over domestic affairs. She made many good-natured and friendly remarks about the ward routine. On examination she neither admitted nor recalled any delusional trends. She remembered none of the incidents immediately leading to her hospitalization. Both she and her family were advised regarding further therapy, but this was refused. The patient was regarded as much improved and was released.

One week later, she was visiting relatives and in the course of an argument, she suddenly became over-active and aggressive; she was then committed directly to the state hospital.

11. N. W. Teutonic male. For four months before admission he had been getting increasingly inert and seclusive. One week before admission, after a severe scolding by his father, he suddenly became mute and bed-ridden. He refused nourishment and was frequently incontinent during this time. He remained in this state after admission. Due to the difficulty in contacting the patient's family (they lived some distance out of town), the diagnosis and treatment were deferred for several weeks. In the hospital he assumed typical catatonic attitudes on several days, and on a few occasions he had outbursts of aggressive behavior. He had to be fed by the attendants.

Several weeks after admission he was started on camphor therapy, and responded with violent convulsions. After the first seizure the patient wept for a few minutes. After the third seizure he began to talk, got out of bed, and ate without assistance. With subsequent treatment he took more interest in his surroundings, tried to be helpful about the ward, and kept himself neat in appearance. Examination at the end of his term revealed a certain amount of retardation in his speech as well as a considerable amount of confusion as to what went on during his disturbed episode. He stated that he was "very sick" and "must have been delirious" during that time. He planned to go to work on a farm until he got stronger and then he wanted to go to work in a factory and attend night school. He was regarded as much improved and release was recommended. At this time, the patient contracted scarlet fever and was transferred to the communicable service for five weeks. He was seen at the end of that period. The retardation of speech had disappeared and his behavior had continued to be satisfactory. He still intended to carry out his plans as mentioned above. He was released when his infection had subsided. He has not kept his appointments to the out-patient department.

24. E. S. Slavonic male. According to his parents, the patient had a sudden onset of talkativeness, restlessness and insomnia three days before admission. He talked for hours at a time about his superiority to everyone else and declared that he felt everyone was an enemy. There soon followed delusions and hallucinations (from the description given by the relatives) of the erotic and religious type. On the day of admission he put his hands into the oven and proclaimed that due to his "power" they would not burn. In the hospital he continued to have erotic and religious delusional trends. He was talkative and restless. He had to be watched constantly because he would either take off his clothes or else would void openly and indiscriminately.

He was placed upon metrazol therapy on the fourth day after admission and responded with only a meager number of severe convulsions. His behavior and speech showed no improvement; he was committed to the state hospital. An interesting feature in this case was that in all his grand mal type of convulsions, he displayed no automatic phase; after the clonic phase he would have a brief period of somnolence. With every petit mal reaction, he assumed characteristic praying attitudes and when questioned, stated that he saw naked women on the walls.

22. E. Z. Teutonic male. For over a year before admission, the patient had been getting increasingly seclusive and preoccupied. Several months before

admission, he stopped working because of vague complaints about his teeth. He did not consult a dentist, however, but just stayed at home sitting in his room. He would go for days without talking and frequently would walk to the window and would look out as though in expectation. On other days he would pace the floor rapidly, lie down for a moment only to jump up again. He frequently went to the sink and drank water day and night. On admission, he gave a long, evasive account of how his system was poisoned by his teeth, and that was the reason for his quitting his job. He was also evasive about his actions at home. No definite hallucinatory or delusional trends could be elicited.

Camphor therapy was started on the fifth day after admission and he responded with confused, apathetic state that occasionally changed to an excited and destructive reaction. He had no convulsive response until the last day of therapy, when he had four successive seizures. The patient was committed to the custody of his mother at her insistence and he was released while still under the influence of camphor.

He was seen one month after release. The confused state due to the camphor had entirely disappeared. The patient was alert and spontaneous. His speech was straight-forward. He could not recall any of the details of his hospitalization except that he felt "awful sick to his stomach" and vomited frequently (true). He showed evidences of being irritated by his mother's constant attentions to him, and he begged to be allowed to work again. He willingly entered a discussion about recreational activities and cultivating friendship. He was sincere in his promises to follow suggestions.

Discussion of Results.

Twenty cases of schizophrenia of the types listed were treated by the irritative therapy as described. In eleven cases the convulsant drug employed was camphor, in seven, metrazol and in two, both were employed. The selection of drugs was arbitrary. The small number of cases precludes the establishment of percentage values or averages. Of these cases there were fifteen who improved sufficiently to be allowed to go home; two cases were improved to a lesser extent and state hospitalization was still necessary; three cases were unimproved. In the first group, two cases who were rapidly recommitted after release, ought to have had more therapy. In most cases the drugs employed are not entirely eliminated from the body for at least ten days after the last injection,[2] and any improvement while still under the intoxicating influence of the convulsant drugs ought to be tested, as it were, by allowing the patient to eliminate the drugs in order to obtain a more correct, "non-irritated," mental status. In the present hospital set-up, this

is rendered very difficult because of the time limitation. In two cases (16 and 25) whose periods of treatment were far in excess of 30 days, it was made possible by transfer of the patient to the neurological service and conducting the therapy and observation there. In the other cases the period of treatment closely approximated the 30-day period. It is interesting to note that in this series, improvement occurred in four cases whose illness had been present over two years, and one case whose illness had been progressing for at least six years. The importance of the combined effect of the deliriform state and convulsive responses is illustrated in cases 19 and 22. The former developed only a deliriform response and improvement was temporary. In the latter case the deliriform response alone was noted up to the last day of his term, when he had four successive convulsions; his improvement has persisted. The complications have been mentioned before. Although we mentioned the laboratory and physical findings only in the sense that we were attempting to exclude contraindicatory factors, these findings were repeatedly checked; but to conserve space we may only mention that not even suspiciously pathologic changes could be detected in the course of the therapy. This is in accordance with the more extensive investigations of v. Meduna.

Comment.

Although the therapy may appear radical in the sense that an induced deliriform and convulsive state is viewed with alarm by the laity and general practitioners, yet the same phenomena are thought of in a rather complacement light if they occur with spontaneous regularity as is the case in true epilepsy. The variability of convulsive doses of camphor (tolerance) is of practical importance and patients who may have had several convulsive responses to lesser doses, *e. g.*, 5.0 to 6.0 gm., may not have any convulsions with such large doses as 10.0 to 12.0 gm. The convulsive level with metrazol, when once established, was easily maintained. The question arises as to whether or not the actual motor responses are necessary for the production of improvement. This cannot be answered by this work. However, with rapid establishment of convulsions, improvement was proportionately rapid. It is felt that the profound psychic upheavals occurring with the

petit mal type of reactions are of importance as well as the deliriform states that were noted especially with camphor. The psychomotor upheaval as a result of a grand mal type response was only too apparent: whereas little or no emotional response could be elicited before a seizure, a rather tearful or frightened reaction often followed it. While it is, as yet, difficult to evaluate the individual importance of motor or psychic upheaval we must consider that both elements are necessary.

As to the number of convulsions necessary for improvement, the following rule was adopted by v. Meduna: the therapy should not be interrupted until 15 to 20 convulsions have been obtained regardless of the clinical state of the patient during the course of the therapy. Or else, *at least* three additional convulsions should be obtained after improvement is apparent. In this work we have had to condense our treatment to conform with the time limitations. Whereas v. Meduna administered the drugs to obtain convulsions twice weekly, we conducted the routine so as to obtain seizures, as near as possible, every other day, and to produce a continuous deliriform state between seizures.

The duration of the illness before treatment is important. As is well-known, those patients who have apparently, an acute or florid onset of schizophrenia are admitted to a psychiatric hospital sooner than those cases having a gradual, insidious onset. Naturally, the therapy should be started before deterioration (irreversible functional changes) has set in. In the 110 cases treated by v. Meduna, 96 per cent of those cases who underwent therapy in the first year of their illness improved; on the other hand, less than 8 per cent of those whose symptoms had extended over three years improved. In our series, two out of three of the 20 cases treated showed improvement although they were over three years in duration, and of the 13 cases under one year in duration ten showed improvement.

Another question that arises is that of the probability of spontaneous remissions or improvements. A conservative estimate of this factor is that at the most, 40 per cent of all schizophrenics will improve in time. By this procedure, the percentage rises considerably above this figure. Furthermore, the course of schizophrenia cannot be predicted; it is impossible to state which particular case will improve and which one will not. The presentation

of the irritative therapy is brought forth with the idea in mind that it is possible to influence the schizophrenic process in a significant manner, and that actual remissive changes may be brought about by bio-therapeutic means.

The exact *modus operandi* of this therapy is as yet unknown. However, theories, as always, may well be propounded. The action of the convulsant drugs is essentially that of irritants to the central nervous system, as witnessed by the powerful psychomotor upheavals, toxic deliriform states and convulsive reactions, when large doses are administered. The action of the alkalinization is that of increasing the irritative background so that tolerance to the convulsant drugs is lowered and the action of the latter made more rapid. As an increment to the theories of v. Meduna, we postulate the possibility of a chemical detoxifying process, because the drugs are foreign to the body, and when given in large doses, may in the process of elimination, bring about chemical union and metabolism of fixed or cell-bound toxic agents that will be eliminated from the body in combination with the drug. v. Meduna mentioned the theory that there occurs in this induced epileptic state a "change in the milieu of the schizophrenic organism—chemically, metabolically or hematologically—that brings about an unfavorable background for the progress of the schizophrenic process." From our observation, we feel that the psychomotor upheavals during the convulsive state, and the prolonged psychomotor activity under the irritative régime indicate changes in the functional barriers discussed in the beginning of this paper. Thus a facilitation of the function of proper thought pathways which heretofore had been clouded or blocked by theoretical barriers to proper nutritional assimilation or utilization is brought about. Whether or not it is essential to produce the violent convulsive responses to bring about remissive changes in the schizophrenic disease process we cannot be certain. Perhaps if the central nervous system were to be irritated by more modifications of this procedure so that the therapy could be carried on over a little longer period of time, improvements could still be obtained. Further work is being carried on with this therapy by the author with the ultimate purpose of changing the long term institutional treatment of schizophrenia to one of much shorter duration and, as seems possible, to extramural practise.

Summary and Conclusions.

1. A recently developed method of treatment of schizophrenia along bio-therapeutic lines was presented. The technique and rationale of the irritative therapy modifying the procedure previously reported by v. Meduna was described.

2. Twenty cases of schizophrenia of various types and durations were treated. Remissive changes or improvements sufficient to allow release were established in 15 cases. Of these 15 cases, two had rapid relapses which could reasonably be attributed to insufficient treatment. Two cases showed some improvement, and three cases remained unimproved.

3. It is concluded as far as possible from this small series, that the irritative therapy of schizophrenia offers hopeful possibilities for the production of remissive changes in the disease process. It is, as yet, premature to indicate whether or not true remissions are taking place and more work is being done in this direction.

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HERPES ZOSTER FOLLOWING LUMBAR PUNCTURE.*

A Case Report.

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While it might be assumed that herpes zoster, as a sequel to trauma, might occasionally follow the procedure of lumbar puncture, a review of medical literature on herpes sinces 1810 fails to show any report of such an occurrence. The case here recorded is therefore of some clinical interest, although it is regretted that very little can be offered as to the etiology or pathogenesis.

R. S., an American aged 37 years, was admitted to the Veterans' Administration Facility February 3, 1937, in an intoxicated condition. The history shows that two weeks prior to admission, because his girl friend refused to marry him, he became depressed and drank whiskey excessively until admission.

Examination showed a thin adult male; fairly well nourished and well developed; blond hair, blue eyes, clear white skin; weight 144 pounds, height 71 inches. Eyes showed hyperopia, O. D. and hyperopic astigmatism, O. S. Ears showed the left tympanic membrane retracted; bone conduction reduced one-third, but still greater than air conduction. Both ears revealed whispered voice only for a distance of 6 inches, and spoken voice 8 feet. Absent tonsils, chronic gingivitis and dental caries. Pulse rate 110, temperature 37 deg. C., respirations 20. Blood pressure 140/90. Heart and lungs reveal no gross abnormality.

Neurological examination revealed the visual fields of both eyes slightly reduced. Optic disc on the left more pale than the right, retinal vessels normal. Pupils react poorly to light; no reaction to accommodation. Station and gait slight ataxia. Deep reflexes—biceps, triceps, brachials, costals and jaw moderately hyperactive, bilateral and equal. Patellar and Achilles absent billaterally. Superficial reflexes, epigastric, abdominal, cremasteric, all normal, bilaterally equal. Plantar reflex sluggish. Coarse tremor of extremities. Thermal and tactile sensation normal.

Mentally, confused, disoriented; active auditory hallucinations; depressed and says he wants to kill himself, "I have a terrible disease, cancer, or tuberculosis; people watch me on the street; oriental dope is injected into me through the walls." Emotional instability, crying for hours; poor judgment, impaired memory, no insight.

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Laboratory reports: urine, specific gravity 1.020, no albumin, no sugar, no casts in centrifuged specimen. Stool findings all normal. Red blood count, 4,760,000; hemoglobin 90 per cent; white blood cells 7,000; blood Wassermann 25 per cent positive.

Roentgenological examination showed slight calcification of pineal body; nasal accessory sinuses clear; small calcified nodule in right lung field; lumbar spine no pathology. Electrocardiogram showed cardiac rate 110, Q wave in all three leads. Basal metabolic rates, plus 3, and plus 6.

Treatment consisted of routine hospital care, light food, bed rest, together with small doses of sodium amytal by mouth. After one week, oriented; mental confusion, auditory hallucinations, and depression gradually left him. He laughed at the idea of killing himself. The blood Wassermann was repeated and showed a 25 per cent positive. Patient feeling fine and wanted to go home.

On March 2, 1937, some difficulty in passing the spinal needle in the intervertebral space of the third and fourth lumbar vertebræ, during which times the patient complained of pain despite the injection of procaine. Finally, the puncture was accomplished and a clear fluid was obtained, under 8 mm. of mercury pressure; cell count of 16, no red blood cells, trace of globulin, total protein of 62.4. Wassermann on 0.1 cc. of fluid 50 per cent, on 0.3 cc. 100 per cent. Colloidal gold curve 2254441100. Queckenstedt test normal.

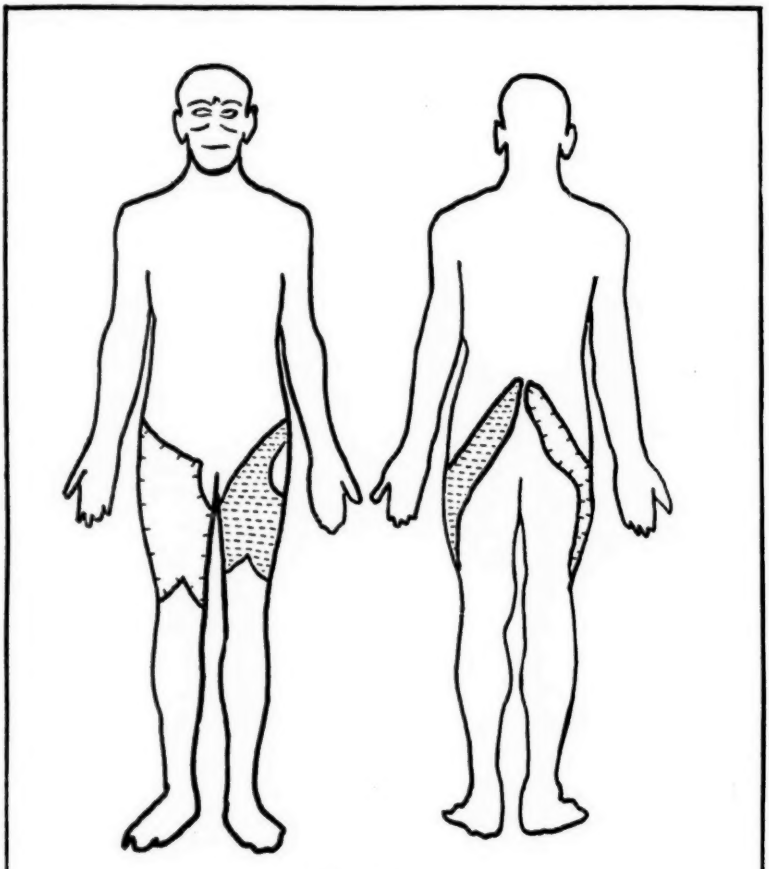
Following this puncture the patient remained in bed for the next five days, having a headache. On the sixth day, he felt well, so walked about the ward.

Onset occurred on the eighth day, with a severe pain in the lumbar area. He was given infra red, followed with methyl salicylate and massage to the lumbar area. This pain continued in severity despite moderate doses of salicylates and codein. After 18 hours a fine erythematous maculo-papular eruption appeared on the left lumbar area and left buttock. On the ninth day the skin lesion spread down the lateral aspect of the thigh and anteriorly on the left leg. On this anterior surface the eruption extended from the inguinal ligament down to the lower third of the thigh. On the eleventh day, large vesicles appeared and the skin lesion was completely developed. The area involved is supplied by the posterior divisions of the first, second and third lumbar nerves, and the anterior divisions, namely, anterior femoral cutaneous, lateral femoral cutaneous, lumboinguinal and ilioinguinal nerves. Fig. 1 shows, on the left side, the distribution of the herpetic lesion and on the right side the distribution of the cutaneous nerve supply of these nerves.

Neurological examination revealed patellar reflexes absent. Cremasteric and abdominal reflexes bilaterally equal and normal. Plantar reflexes sluggish. Tactile sensation showed hyperesthesia over the anterior and lateral surface of the left leg down to the knee; and posteriorly over the left buttock upwards to the lumbar area. This area of hyperesthesia extended beyond the area of the herpetic lesion. Over this area there was no change to thermal sensation. On the right lumbar area and right leg there was no change from the normal in tactile and thermal sensation. Temperature 37 deg. C., pulse 100, respiration 18. White blood count 10,200, polymorphonuclears 75 per cent,

lymphocytes 18 per cent, eosinophiles 1 per cent, large mononuclears 4 per cent, and transitionals 2 per cent. All findings were normal in the urinalysis.

Treatment consisted of sodium iodide grams 1, intravenously on the ninth,



eleventh and thirteenth days. Roentgenotherapy consisted of 40 milliampere minutes, at 190 kilovolts, filtered 5 mm. of copper, at a distance of 70 cm., covering an area of 18 by 9 cm. over the site of lumbar puncture upwards to the twelfth thoracic vertebra. This was given on the tenth, twelfth and

fourteenth days. After the second roentgen ray exposure, the pain completely left the patient. In one week the herpetic lesion rapidly faded away and there were no residuals of pain or discomfort.

COMMENT.

This case of herpes zoster is not the essential type which is thought to be due to a virus similar to that of chicken pox; as there were no constitutional symptoms of fever, chills or tachycardia. The pain was the only symptom present in this case and is characteristic of secondary herpes zoster, such as due to syphilis, Pott's disease, spinal tumors, trauma, arsenic poisoning, etc. At no time in the patient's life history has he ever had any antiluetic or arsenical therapy for syphilis. The roentgenographic study of the lumbar spine and the negative Queckenstedt test rule out Pott's disease and spinal tumor. With these points in mind it must be concluded that the case here presented is a rare one in which direct trauma resulted in a herpetic lesion.

The chief evidence of the focus of the lesion shows the disturbance to have been in the somatic sensory component with some involvement of the splanchnic motor component, while the lesion itself was irritative in nature. The distribution of the cutaneous lesions showed that the pathological process was a disturbance of segmental function limited to dermatomic areas of the left side supplied by the first, second and third lumbar segments, involving alike the anterior and posterior dermatomic divisions. This localization provides two alternatives; first, in the peripheral nerves, including the first, second and third lumbar nerves; or, second, in the dorsal root ganglia corresponding to these nerves. As a rule, peripheral nerve lesions give sensory changes confined to the anterior dermatomic divisions. Here both anterior and posterior dermatomic divisions were implicated, which is the case of dorsal root ganglion involvement as well as in the dorsal root lesion.

The posterior root ganglion lie deeply protected by bone in the intervertebral foramen, it is unlikely in ordinary lumbar puncture technique that any trauma could occur directly to the ganglion. But the dorsal roots are somewhat fixed as they emerge from the meningeal membranes, so could be traumatized. Such trauma could produce an irritation which could travel to the dorsal root ganglion and up to the intersegmental neurones in the column of Clark. In

the posterior funiculus, this traumatic disturbance could spread by the intersegmental fibers to the closely neighboring dorsal roots of the second and first lumbar segments.

It cannot be stated definitely that no low grade infection, due to a virus, was added to the trauma. But it is thought to be unlikely as there were no signs of infection, such as fever, chills and tachycardia. The very short duration of the herpetic symptoms would indicate that infection was absent.

It may be said that the appearance of herpes zoster following lumbar puncture in this case is merely a coincidence, as it might be argued that the herpes is of luetic origin and would have occurred had the puncture never been made. This is possible, but the fact that the herpes followed the trauma of lumbar puncture and is so closely related to the lumbar nerves at the site of puncture, makes it difficult to believe it to be merely a coincidence.

It may be stated that the lumbar puncture facilitated the development of the herpes zoster as a luetic manifestation. Thus the herpes was due to the released luetic process rather than the trauma. But if it were a luetic herpes, it would have had a longer duration than one week, since no antiluetic therapy was given the patient. As it could hardly be expected that sodium iodide or roentgen therapy would be curative in a pure traumatic lesion, it is probable that the treatment had nothing to do with the short duration of the disease. Thus we may conclude that the short duration of the herpes was due to a mild irritative trauma of the dorsal roots rather than to any other process.

CONCLUSIONS.

Trauma can produce herpes zoster; and, as shown in this case, it can be produced where a spinal needle was passed with difficulty. This trauma occurred between the third and fourth vertebræ, where the dorsal roots of the left third lumbar nerve emerge from the meningeal membranes and descend downward and lateralward into the intervertebral foramen, wherein lies the dorsal root ganglion. This traumatic irritative disturbance was transmitted down to the dorsal root ganglion, and upwards to the intersegmental neurones in the cord to the level of the first lumbar segment. Thus the second, and first dorsal root ganglion exhibited this irritative disturbance; resulting in herpes zoster in the cutaneous distribution of these nerves in their dermatomic areas.

SUMMARY.

The case of a white adult male suffering from herpes zoster following lumbar puncture is reported. The herpetic eruption developed eight days following the trauma of lumbar puncture. The herpes zoster cleared up completely after one week of described treatment. An explanation of the neurological basis of the herpes zoster has been submitted. This is a rare condition considering the millions of lumbar punctures routinely done, in which no mention has ever been made of such an occurrence.

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PRESENT CRISIS IN SOCIAL RELATIONSHIPS.*

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Professions, the same as nations, have critical periods in their history. The psychiatric profession is at one of the cross roads. Certain decisions are made at such times that affect for long periods the direction and development of the profession. Our situation now is a close parallel of one that confronted the medical profession about 30 years ago when a general interest in public health and hygiene manifested itself. We all know how the profession, by being slow in recognizing the importance of this movement and accepting leadership in it, failed in a considerable measure to control and command this great field which we now recognize as being of equal importance socially and to the individual as is the treatment of disease. Today there is the same, or even greater general interest, in mental health and mental hygiene in their broadest meaning as there was in public health and personal hygiene, say 30 years ago. Now, as then, there are members of the profession who say, "This is our field; we must develop it slowly, and when we are ready we will let the public know what we have learned, and teach them to apply our principles."

Fifty per cent of all the people who present themselves to physicians for treatment have a mental illness, mental conflicts, or a mental history that easily may lead to a neurosis or psychosis. While the majority of these sick people do not come to physicians for mental treatment, many of them now do, and most of them are willing and anxious to receive help for their mental ills or poor psychic adjustments. Many of these people will become mentally ill in some degree if they are not given some kind of help.

A great majority of the physicians who treat these patients have had, either in medical school or in other ways, almost no formal training in the early diagnosis or treatment of mental illnesses, mental abnormalities or maladjustments, and only perfunctory train-

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

ing in fundamental psychiatry. Less than 2 per cent of the physicians in the United States and Canada are psychiatrists. Fifty per cent of all the sick people in these two countries who are hospitalized, are in mental hospitals or mental institutions and these, of course, occupy the time of almost all of the small number of psychiatrists who are trained and experienced in the care and treatment of this most unfortunate group of sick people.

Thirty years ago psychiatry began to move forward more rapidly. Some increased success in the treatment of the neurotic and even the psychotic patient was reported. A beginning was made in the understanding of the cause of mental disease. The very important fact that mental disease is not of sudden origin was established. These beginnings threw a dim light on some of the great *social* problems as well as on the problem of mental disease itself.

Relationships of mental disease to delinquency and crime were suggested. Legislators and courts became interested in psychiatry.

The concept of intelligence as a faculty of man that could be measured and better understood and utilized to maintain, and even to regain, mental health, happiness and normalcy, as well as a tool that could be used to help him make his living was established. Educators became interested in psychiatry.

Psychiatrists commenced to talk about group neurosis, national paranoia, and to explain group attitudes and behavior in psychologic ways that seemed logical. Sociology and politics became interested in psychiatry.

The psychiatrists commenced to see the tremendous importance to the individual of the efforts he makes in his childhood and maturity to understand his confusing world and his mysterious self. The relationships between these efforts and mental health were pointed out. Religion was seen as man's most important concrete manifestation of this psychic activity. The church and the clergyman became interested in psychiatry.

Thirty years ago when the ideas originating largely in psychiatry, but coming from other fields as well, began to crystallize into what is now usually called "mental hygiene," there were already many groups of people approaching the problem of helping others less fortunate than themselves to find a better adjustment to life. Some of them already called themselves social workers. Others had other

names. All were floundering in their theories and practices and largely at a loss to explain their successes or failures. They attempted to help or change individuals. There was no agreement as to what kind of change should be sought for, or what kind of help was truly helpful. When the psychiatric study of the individual was established as a dynamic constructive approach to an understanding and solution of his problems, it not only offered these people new hope for better standards and results, but furnished them a common meeting ground. Real integration and organization of social work within itself has come about most largely through the gradual development and practice of social psychiatry and mental hygiene. Of course, the social worker became interested in psychiatry and, we must all admit, has made no insignificant contribution to modern psychiatry itself.

Many of the leaders in all of these fields allied to medicine, for allied they are, even though we as a medical profession sometimes try to avoid a recognition of our close relationships, were and are conservative and yet hopeful as to how much or how rapidly the psychiatrists might bring them help with their problems. But conservatism was difficult. Psychiatry developed most rapidly during the years when tremendously important scientific discoveries were being made. Nearly everyone believed that science could be relied on to solve every problem. When Healy reported that a few bad boys who had solved their mental conflicts, were no longer delinquent, it was immediately assumed by many that the solution of the problem of crime had been found. When Goddard reported that a few unhappy, maladjusted, feeble minded patients had found, through the education of their hands, a happiness, many assumed that special classes and special training would solve the social problem of the feeble minded. When Freud reported that a few obsessional neurotics had found surcease from their mental torment through psychoanalysis, it was assumed by many people that the problem of mental disease was about to be solved.

Then came the war with all its material and psychic implications. Governments and social systems toppled and fell. Our own, we felt, was threatened. Religion was suddenly neglected or rejected by many individuals as well as entire nations. Religious creeds were changed. New ones sprang up. The nations of the world found

themselves profoundly in need of help, and millions of individuals came to realize that *they* needed help. This condition still prevails and now the whole world is turning to psychiatry. In this country particularly, there will be *no long waiting* for us as a professional group to slowly solve our problems of integration within ourselves or with the new groups or professions more or less related to us. The time has come when we can no longer work on these problems slowly. We must make some decisions or the decisions will be made for us.

The Committee on Social Relationships of this society has, during the past few years devoted much time and study to these problems. It is highly important that this society as a group, and the members as individuals, should become aware of these situations and problems. We must inform ourselves about them to the end that we as a profession may act wisely and well in making decisions that will finally determine the position our profession will hold. I propose to discuss informally some of the more important.

Some 15 or 20 years ago, preventive psychiatry and early psychotherapy had their first formulation. The idea that human unhappiness and maladjustment, both social and personal, had some very direct relationship to mental disease was formulated and accepted. The understanding of this relationship in all its ramifications brought a new understanding of mental health as something that might be planned for in the child's experiences, might be maintained in adulthood, and may even be regained if lost. Everyone assumed that this new and enlarged approach belonged to psychiatry which had, of course, had the major part in describing the principles on which this new thought is based. But the idea was popularized and was grasped by a confused and faltering world, and especially by those people and agencies and institutions whose field of effort was helping people get out and keep out of trouble with themselves and others. It was over-popularized and over-sold. Too much was promised. False hope was held out. Psychiatry was not accountable for all of this, but we certainly were not blameless. But despite the inevitable disappointments, the idea and practice of mental hygiene remain and grow and become more constructive, useful and more health bringing as our mistakes in theoretical thinking are corrected and conservatism again comes into its own as it always has and

always will in all branches of medicine. The question now is, and it is a very important question for the psychiatric profession: what is to be our part in this great movement of mental health? Is psychiatry to maintain its leadership that will be more conservative, more productive, and at least for the next generation, more useful than any other leadership that may develop or can develop within the present generation?

Let us to take stock and see where we now stand. Where are we now? A hundred thousand school teachers and principals are trying to put into practice the principles and sometimes the theories before they become principles of mental hygiene. Within 10 years from today five hundred thousand teachers, all of them in fact, will be trying to mold all of the children of our great school system into patterns of mental health. They are, and they will be, thus trying to prevent mental disease as well as trying to make our children develop into happy and well adjusted adults. This will happen whether psychiatrists think it will or not, and whether psychiatry takes the lead or not.

Where are we now? Approximately one-fourth of all people, both children and adults, who are accused of crime in this country are being thought about and studied, and sometimes treated in terms of mental hygiene. Within 10 years, if present trends continue, as they will—witness our new social security laws—a major part of all our criminals will be so studied and treated. Again, this will happen whether we as a professional group think it should or not, and whether or not we accept the leadership in the training and supervision of the thousands who are going to carry it on.

Where are we now? Conservatively one million fathers and mothers are trying their best, in one way or another, to inform themselves so that they may utilize the principles that mental hygiene is suggesting as practical ways of bringing up their children to the end that they may have normal mental lives and good personality adaptations. We all agree that these efforts will have a profound effect for good or ill. Who is to establish these principles and who is to teach them? We know that only a small part of such teaching that is being given these anxious parents is being done by properly trained and conservative psychiatrists. Psychiatry will never solve this problem by condemning the practice of thoughtless,

careless, popularized newspaper type of psychiatric and mental hygiene teaching, but they still have the opportunity to effectively combat it by doing it themselves. But in this matter and with others of the problems that we are now facing we must have the help of the general medical profession. And that brings us to another of our problems of social relationships.

And where are we now? This year 16,000,000 people will consult physicians of the United States and Canada. One-half of these will need mental help of some kind. Because of increased dissemination of knowledge concerning psychological facts and fancies, but more because of the great and increasing need for this kind of help in this confusing world, there will be more of these 8,000,000 people who will expect the physician to be the psychotherapist or to recognize his need for someone who can help him, than there was last year. Next year there will be more than ever who will recognize this need. Are physicians ready to supply it? This audience knows the answer to this question. Are we interested in the fact that they are not ready? To say we are not, is to say in effect that psychiatry as a profession is either unwilling or unable to accept as part of our professional field the great field of mental health. Is it in part our fault that psychiatry does not have its proper place in the medical profession? Within ourselves we are thoroughly agreed that psychiatry is a part of medicine, and that the practice of the art of mental healing belongs to us as members of the medical profession. But is the medical profession as thoroughly convinced that psychiatry is a part of medicine, as is the psychiatrist? Are they as disturbed as we would wish when they find some nonmedically trained person practicing psychiatry? Is it not true that many physicians thoroughly competent to treat physical diseases will give inexpert advice to mentally disturbed patients or will belittle their symptoms, or perhaps suggest some type of unethical treatment, not recognizing that the psychiatrist is trained to deal expertly with the situation? Is it not true that many physicians are even proud of the fact that they have no knowledge about, or interest in, psychiatry? In short, while we consider ourselves doctors, are we in truth considered such by all the members of the medical profession?

The question of psychiatric education in the medical schools is the most dynamic question that faces the medical profession today.

Unless the next generation of physicians are trained to help the psychiatrist in the early diagnosis and in the treatment of the simpler and early conditions to the same degree that the general practitioner directs hygienic measures and treats the less complicated disease processes that, becoming serious, are the problems of the specialist, the psychiatrists will no more be able to carry on all the treatment and education that will be demanded of them within the next few years, than could the oral surgeons extract all the temporary teeth of all the children in the United States. In the bringing about of the changes that must occur in the psychiatric teaching in our medical schools, those psychiatrists who see the need of psychiatry accepting this new and tremendously greater responsibility, must take leadership.

Nearly all psychiatrists are commencing to recognize the same fact that the general medical profession finally recognized 50 years ago, after a great deal of resistance when the training of nurses in the techniques of the art and science of medicine was under discussion. We now know that we must have trained people to help us, and that we can have them and still maintain control and leadership in our specialty in medicine, as has the doctor maintained his leadership in physical medicine, despite the fact that there are many times more nurses and technicians who are trained in medical sciences than there are physicians. We cannot get along without social workers and they bring us problems.

Two important facts should loom large in our consideration. First, the tremendous increase in the number of people who, in the various and diverse fields of social work, are being trained in social psychiatry and mental hygiene, and in the rapid augmentation of the importance of the positions these social workers hold. And they nearly all bring the "psychiatric approach" to their tasks. Social workers are directors of vast government projects, they head private agencies and institutions of social welfare. They hold important political and government positions. They are law makers, expert advisors and cabinet members. They make laws and determine policies of the greatest importance to the mental welfare of great numbers of people. The psychiatric profession is represented almost not at all in these same fields. Second, the rapid change that is occurring in the aims and techniques of social work. Technically

they call it "a new emphasis in case work." To all intents and purposes it is practicing psychiatry, elementary psychiatry perhaps, but psychiatry none the less. In only a very small way, and in isolated instances are these social workers attempting to infringe on our professional field. But their area of activity is being constantly enlarged because more and more it becomes evident that they cannot choose the kind of case work they must do. If they do not include in their study and treatment an approach to the mental life of their clients, they will fail in results, and they will lose their jobs.

Psychiatry was not ready for this rapid growth. Had the general medical profession been trained and prepared to help us with the problem, we would not be as overwhelmed as we now are. In many cities of from 25 to 100,000 population there will be say, 50 social workers in family agencies, public school systems, juvenile and adult courts and in religious agencies who have had formal, and often very good training in social psychiatry and mental hygiene who need, and are desperately looking for consultation and advice from the psychiatrist. And in these same cities there will often be not one single psychiatrist who sees their need and has time and the training necessary for him to supply it, even in a very small way with the more serious cases. Of these 50 workers it would be a safe guess to say that 48 have strong disinclinations to take the responsibility in psychiatric diagnosis and psychotherapy that their work demands.

An even more serious fact is that the demand for good teaching of social psychiatry and mental hygiene in the schools where these workers are being trained cannot at present be met. Also a part of their training must necessarily be field training. It has been assumed, and probably correctly, that the best place for such training, at least the basic part of it, is the mental hospital. But many mental hospitals have been slow to enlarge their personnel and expand their ideas and practices in social psychiatry sufficiently to supply this need for field training.

The result of these various situations is that not only is the social worker handicapped when he or she seeks leadership and supervision from the psychiatrist, or from the physician who is the next person to whom they turn, but they are also handicapped by being trained often, both didactically and in practice, by nonpsychiatric and even nonmedical personnel.

The stage is set for some change. There is only the remotest possibility that the change will be a decrease in demand for social workers. Modern social work is producing results. The results are not as good as they would be were the psychiatric profession ready and equipped to keep pace with its rapid development. The social worker needs help. His job is too detailed and likewise too important for him to ever consider himself self-sufficient. He will need definite help in his more serious cases. He needs advice and supervision in his simpler ones. He needs supervision in his duties as an educator and leader in community thought, planning and training in the field of mental health and social psychotherapy. One of two things will happen: either psychiatry will supply his needs or a new profession will develop. What can we do about it now?

First, we can admit our inadequacy at the moment to handle the situation efficaciously.

Second, we can train more young doctors in social psychiatry.

Third, the institutional group can enlarge their activities to include more out-patient service, better supervision and treatment of the people who have been mentally sick and in institutions, or who are in danger of becoming institutionalized and thus provide better training for social workers, and better training for their junior staff in using social workers to help them in the practice of psychiatry.

Fourth, psychiatrists can give of their time and attention to community and social planning, and lend a conservative note to over-enthusiastic boards of education, executive committees of social agencies and religious groups who are trying to develop mental hygiene resources when there is little or no possibility of their being able to do so.

Fifth, we can provide opportunities for doctors who are now practicing medicine, and there are many of them, who want information and training in the field of psychiatry. The great body of medical practitioners regret the fact that they do not know more about the recognition and treatment of the milder forms of mental disease, and they regret the fact that they seem no longer to be intimately in the situation as a physician when their patient becomes mentally sick. More good books written by psychiatrists for the general practitioner are needed. Medical societies are always open

for papers on psychiatric aspects of medicine, especially if these carry concrete suggestions that the physician may use. Medical journals can be encouraged to publish such articles, and doctors encouraged to read them. We must frankly admit to the general medical profession that we need their help and, failing to get it, we must needs accept the more limited view of psychiatry as a profession dealing with the diagnosis, care and treatment of the seriously mentally ill.

Sixth, and this in my opinion, is the true attack, we can teach medical students psychiatry in such a way that it will be considered a basic part of medicine. Medical students are not different from other human beings. It is only the ultra-scientific approach to the teaching of medicine that has made it possible for a generation of physicians to approach in a detailed, often very successful way, the treatment of the diseases and dysfunctions of the various organs and systems of their patients with almost complete disregard for the patient as an individual. It is the fault of the training of the medical student that when the average physician is approached by law-makers, executives or social planners, he is unable to add that note of understanding, or give the concrete advice that is needed. We, as a medical profession, have a great birth-right in leadership in the field of human relations. We have been bargaining this away needlessly. Very definitely the trend in medical education is toward the teaching of psychiatry in its broader aspects. Our society and our profession must endorse and insist on this in every way possible if we are to retain our leadership in the field of social endeavor and social change.

And, finally, I should like to mention very briefly the perhaps most significant and often entirely overlooked situation now awaiting our action. In this country and in many other countries profound and rapid changes in social relationships are occurring. These are being reflected, and often seemingly brought about, by new laws. In the United States within the past four years there have been passed literally hundreds of laws, both federal and state, that carry a direct or indirect psychiatric implication. The execution of these laws is creating a demand for psychiatrists in new jobs and new set-ups. There are few psychiatrists who have had proper training and few opportunities for young physicians to get

the proper training for these jobs. Some of them are being filled by nonmedical people. In many states laws governing mental examination of criminals and defectives are being changed so that the examination must be made by a truly qualified psychiatrist. Rapid social changes are producing personal tensions in large groups of our citizens, thus directly increasing the number of people who need therapy or institutionalization. Perhaps the most important point of all in the immediate present is this: law makers and executives are turning to psychiatrists for advice as to how the laws should be written and enforced, for predictions as to what effect these new plans will have on the psychic adjustment of the citizens. In one way or another, and after few or many trials, successful plans for social welfare are going to be formulated. Are we as a profession to have our just part in them? All these things bring a demand for a broader kind of thinking on the psychiatrist's part, and we, as members of the profession, should get the concept of psychiatry as a broad and basic profession, if we are to function in our proper place in years to come. For examples:

Will psychiatry have any part in the formulating of plans that will lead to the solution of the great problem of decreasing the number of children predestined to a life of unhappiness, disease and failure that will be born?

Shall we have anything to say as to how we as a nation may lay plans to prevent sudden and catastrophic changes in forms of government?

If science and religion are to find a common meeting ground and religion again have, as it has in the past, a profoundly helpful part in most people's lives, are we to help find this meeting ground?

If people are at length to find some other value in life than wealth and possessions that will carry them through times of financial depression without injury to their personality, are we to have a part in this?

If war is finally to be no longer a part of human behavior, will we have any part in bringing this about?

Now, all of these problems originate in the mental life of human beings. We are doctors of the mind. Let us assume our responsibility.

DISCUSSION.

DR. GEORGE S. STEVENSON (New York).—Most of the sessions that have been held under this program might be termed scientific sessions. This one is a session of propaganda or promotion. I think we have to come to a true appreciation of the relationship between a scientific effort and a promotional effort.

All the points that Dr. Hartwell has brought out are worthy of continued consideration. They are realistic; they are capable of achievement.

I went into the classroom of a professor of psychiatry who was teaching his first-year medical students. He was putting before them the picture of a community, putting before them the fact that people are, after all, integrated beings, that they were going to have to deal with a part of that integrated person, but there were other parts of the community that were dealing with other parts of him, and so he was presenting the community to these students so that they would know that with which they would have to cooperate, and know the functions of each of these, educational, judicial, social service, theological and other aspects of the community.

I might say that this professor, who was Dr. Hartwell, then went on to discuss the county medical society as a community agency, the things that made it resistant to progress, the things that made it defensive, the things that made it keep aloof from those that it should be cooperating with, the things that made it steer clear of the realities of the social problems of people and refuse to do what it could to attack these social problems, merely opposing those who went ahead with extreme proposals for dealing with them.

I think that presentation to those first-year medical students is an example of the reality of the thing that Dr. Hartwell is dealing with.

In May, 1937, that is this morning Ruggles and Fitzpatrick presented a paper before this Association, calling attention to the fact that the hospital is a community agency. It has suffered isolation because it has been withdrawn from its community in order to achieve a higher level of professional service, and in being drawn from its community, it has often lost its grasp on the community, and the community has lost grasp on it. It is the recapturing of that relationship that Dr. Hartwell has in mind, the recapturing of it sufficiently so that when the government comes along with a local project which needs psychiatric advice, they can say, "Well, here are a group of psychiatrists who know so much about our community, who are so interested in the problems that people are faced with in this community that we can fully depend upon their participation.

Dr. Hartwell also spoke about the question of leadership, as also did Dr. Ruggles and Dr. Fitzpatrick. I don't have a great deal of fear that leadership will pass from psychiatry to other hands when it is leadership concerned with psychiatric problems, because there is necessary to that leadership a certain foundation of technical appropriation. I do have fear that the progress may be muddied somewhat, and delayed a great deal by

the weakness of psychiatric leadership, and distorted through the interference of political activities that come in through the gaps permitted by that weakness.

I have no fear, also, because I know that social work has such an immense job in its own central point of activity that it isn't going to be able to go over and do a lot of psychiatry. They may talk about it, but if you actually go into it, that represents an interest in a border zone. They are very heavily preoccupied with another type of work, and they are demanding of psychiatry certain specific things which Dr. Hartwell has pointed to. They want help; they are afraid of some of the things that they are running into. They want to be able to take a record to a psychiatrist and say to him, "Look this over; see if you think this patient ought to be sent to you," and if he says, "I won't look it over unless I can see the person himself or herself," something is lost. Or a little further on he will say, "Can you give me consultation on this case?" or, "Can you hold a conference for our staff that will help in their development and help in the mutual relationship of these two professional activities?" or, "Here is a patient, obviously a psychiatric case in this home, disrupting the whole life experience of the children in that home. Does the patient have to commit some crime before he can get psychiatric advice and be taken to a hospital? What can you do to provide us with family physicians who are psychiatrically oriented?"

They are all problems that are being put up to psychiatrists, because the dealing with people demands of social workers that they face their problems. They are passing some of them on to us.

Our Government has WPA programs which put up buildings. We have to be very careful that those buildings do not crystallize for fifty years to come a situation of 1936 and '37, because they are hard to move. Then we have an entirely different activity under the Social Security Act, which we might speak of as functional, in which the Government is going into communities and is saying, "We will participate if your standard of activity is high enough," and then they have to go to psychiatrists and say, "What is the standard of activity in this field that we must demand of those communities?"

That is another thing that is going to put a requirement upon psychiatrists particularly in mental hospitals, because they are the only generally distributed psychiatric activity, to cooperate with the Government in providing a high type of psychiatric service, and in moving up its front line so that the rest of the social program can also move ahead.

DR. SAMUEL HARTWELL (Closing) (Buffalo, N. Y.).—It seems to me one of the things we should think most about is to keep mental hygiene and the state hospitals, extra-mural and intramural psychiatry close together. I practiced medicine for fifteen years. I was in a state hospital for five. I have been in extra-mural psychiatry for about the same length of time, and they belong together. I think perhaps the state hospital group have

neglected sometimes the opportunities that they have had to enter the field of mental hygiene. There are many reasons why they should do this. They should do this first, I think, to keep themselves alive, to keep themselves confident, to have enthusiasm for their work and faith in it. Secondly, I think they should be together with the extra-mural group so that they may keep a check on the extra-mural group. No doubt we get too enthusiastic at times. That is another reason why we belong together. We belong together because we are working to the same end, mental health.

THE EFFECT OF THE STIMULUS WORD USED UPON SCORES IN THE ASSOCIATION-MOTOR TEST.

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During the past 30 years under the influence of the experiments of Jung,[4] Kent and Rosanoff,[5] Woodrow and Lowell,[7] *et al.*, the word association method has come to be well established in clinical psychology and psychiatry as an indicator of mental complexes. Recently A. R. Luria[6] has developed a refinement of this technique involving, in addition to the conventional indicators (verbal disturbance and disturbances of reaction time), disturbances of voluntary and involuntary movements of the hand. Experiments with this association-motor technique have been made by Luria,[6] Huston, Shakow and Erickson,[3] and by Barnacle, Ebaugh and Lemere.[1] The majority of the studies have made the assumption that the specific word used in the test calls up in the mind of the subject a specific complex with which it is associated and thus through this associational bond leads to a disturbance in the test. As a result of extensive testing of more or less normal individuals, the writers were led to believe that association might better be conceived of as a mental process and that disturbances in association tests might be indications of the amount of disturbance of this process, rather than rising from a specific situation which is presented to the subject's mind by the specific test word. It is this thesis which the present investigation will attempt to substantiate. In addition, evidence will be presented as to the presence and magnitude of practice effects in the association-motor technique.

The two lists of words most commonly used in association tests are those of Kent and Rosanoff and of Jung. Each is composed of 100 words. These lists were standardized in radically different ways. That of Kent and Rosanoff was an attempt to select a list composed as nearly as possible of "neutral" words while that of Jung is composed of a large number of "critical" words and few "neutral" words. If both of these lists were given to the same

subjects, one would expect a higher score on the Jung list (provided the hypothesis of a specific word calling up a specific response is correct) since, if this list contains more words "critical" to common complex situations, we should expect by chance to hit into a greater number of complexes in a group of subjects. If, however, the hypothesis advanced in this study is correct, we should expect the same average score regardless of the list used, since in this case the words used represent merely a sample of the functioning of the mental process regardless of the nature of the word, provided only it be a common word whose meaning is known to the subject. If this hypothesis is correct, any list of words of the same length chosen at random should give the same results.

The subjects were 50 boys from the State Juvenile Home at Toledo, Iowa.* These subjects ranged in chronological age from 12 to 18, in mental age (Binet) from 12 years, 8 months to 17 years, 3 months, and in IQ from 82 to 118. The mean chronological age was 15 years, 2 months; mean mental age, 14 years, 2 months; mean IQ, 96. This represents an unselected group except that a subject was required to have a mental age of 12 years or more.

The apparatus used by the writers consisted of a polygraph set-up which included an electro-magnet system for recording time between stimulus-response, and two tambour air systems for recording motor responses from pressure cups for each hand. The subject was seated comfortably with his arms at ease on a table in front of him. The preferred hand was so placed that the tips of the first and second fingers could be used to press on one of the pressure cups. The nonpreferred hand was likewise arranged so that the first and second fingers could rest passively on the other pressure cup. These cups were constructed so as to record the slightest pressure and tremor on the polygraph.

Four components of the association were thus recorded: reaction time, verbal response, voluntary motor response and involuntary motor response. In obtaining the total weighted score each disturbance of verbal response was multiplied by one, each disturbance of reaction time by 12, each disturbance of voluntary motor response by six, and each disturbance of involuntary motor re-

* The writers are grateful for the co-operation and assistance of Miss LaVere Smith, superintendent of the State Juvenile Home.

sponse by seven. The apparatus and scoring technique are the same as those used by Houtchens.[2] The reliability of scoring as reported by Houtchens is $.95 \pm .01$ on disturbances marked.

A standard procedure was strictly adhered to in administering the test to each subject. The factors involved in administration included putting the subject at ease and removing any apprehension toward the apparatus, using the same directions for explaining the procedure to each subject, and excluding any external disturbing factors from the scene of the experiment.

Each subject was tested twice, once with the Kent-Rosanoff list of words and once with the Jung list. The tests were given on two successive days. Since it was desired to separate the influence of practice effects from the influence of the list used, the group was divided into two parts, the order of the lists being alternated between the two. That is, one-half of the group was tested with the Kent-Rosanoff list the first day followed by the Jung list the second day and the other half was tested with the Jung list the first day followed by the Kent-Rosanoff list the second day. The tests were scored and the means and standard deviations for each of the four components computed in terms of frequency of disturbance, and the mean and standard deviation of the weighted total computed in terms of score units. These results are presented in Table 1.

In the first half of Table 2 are presented the differences which have to do with the factor of list differences. These three comparisons are those between the Jung list given first and the Kent-Rosanoff list given first, the Jung given second and the Kent-Rosanoff given second, all of the Jung scores combined and all of the Kent-Rosanoff scores combined. From Table 2 it will be seen that all of the differences are not in the same direction, ten being positive and five negative. The critical ratios vary from 0.00 to 2.23. Thus none of the differences are statistically significant. We, therefore, conclude that there is no difference between mean scores on the two lists.

Another method of testing for list differences was by correlation. The Jung lists were correlated with the Kent-Rosanoff lists yielding an r of .79. The split half reliability of this technique is .82. Thus it is seen that the correlation between the two lists approaches closely the reliability of the technique, indicating that

TABLE 1.

SUMMARY OF THE MEAN NUMBER OF DISTURBANCES OCCURRING IN EACH OF THE FOUR COMPONENTS AND TOTAL WEIGHTED SCORE OF THE ASSOCIATION-MOTOR TESTS.

		Individual verbal response.		Delayed reaction time.		Voluntary motor response.		Involuntary motor response.		Weighted total score.	
Test.	No.	Mean.	Standard deviation.	Mean.	Standard deviation.	Mean.	Standard deviation.	Mean.	Standard deviation.	Mean.	Standard deviation.
Jung *	25	7.68	4.72	12.60	7.54	34.16	17.57	11.00	8.82	444.50	138.56
Kent-Rosanoff * ...	25	6.76	4.12	9.28	8.10	39.00	22.26	10.68	9.57	430.50	247.62
Jung †	25	6.52	3.73	9.96	10.55	34.08	19.02	8.24	6.72	386.50	223.51
Kent-Rosanoff † ...	25	6.72	4.72	8.76	7.70	31.52	16.52	11.56	10.87	386.50	180.15
Jung * and Jung †..	50	7.10	4.30	11.28	9.23	34.12	18.14	9.62	8.17	415.50	194.73
Kent-Rosanoff * and Kent-Rosanoff † ..	50	6.74	4.53	9.02	7.88	35.26	19.96	11.12	10.19	408.50	214.81
Jung * and Kent-Rosanoff *	50	7.22	4.46	10.94	7.74	36.58	20.05	10.85	9.28	437.50	197.69
Jung † and Kent-Rosanoff †	50	6.62	4.37	9.36	9.23	32.80	17.86	9.90	9.20	386.50	209.06

* Test given first.
† Test given second.

TABLE 2.

DIFFERENCES IN THE MEAN NUMBER OF DISTURBANCES OCCURRING IN EACH OF THE FOUR COMPONENTS AND TOTAL WEIGHTED SCORE OF THE ASSOCIATION-MOTOR TESTS.

Test.	Individual verbal response.			Delayed reaction time.			Voluntary motor response.			Involuntary motor response.			Weighted total score.		
	Difference.	Probable error.	Critical ratio.	Difference.	Probable error.	Critical ratio.	Difference.	Probable error.	Critical ratio.	Difference.	Probable error.	Critical ratio.	Difference.	Probable error.	Critical ratio.
LIST DIFFERENCES															
Jung * and Kent-Rosanoff *	.92	.85	1.08	3.32	1.49	2.23	−4.84	3.82	1.27	.32	1.75	.18	14.00	38.27	.37
Jung † and Kent-Rosanoff †	−.20	.81	.25	1.20	1.76	.68	2.56	3.40	.75	−3.32	1.79	1.85	0.00	38.71	0.00
Jung *† and Kent-Rosanoff *†	.36	.59	.61	2.26	1.16	1.95	−1.14	2.57	.44	−1.50	1.24	1.21	7.00	27.65	.25
PRACTICE EFFECTS															
Kent-Rosanoff * and Kent-Rosanoff † ..	.04	.85	.05	.52	1.51	.34	7.48	3.74	2.00	− .88	1.95	.45	44.00	41.73	1.08
Jung * and Jung †..	1.16	.81	1.43	2.64	1.75	1.51	.08	3.50	.02	2.76	1.57	1.76	58.00	39.14	1.49
Jung * and Kent-Rosanoff * and Jung † and Kent-Rosanoff †	1.10	.60	1.83	1.58	1.15	1.37	3.78	2.56	1.48	.94	1.25	.75	51.00	27.45	1.86

* Test given first. † Test given second.

the substitution of a new word list does not change the placement of the individuals in the group significantly more than would a second administration of the same word list.

Further, 19 words were found which were identical in both lists. These 19 words were sorted out and separate scores computed on this basis for both lists. That is, a score was computed on these 19 words administered in the Jung list and another for the same 19 words administered in the Kent-Rosanoff list. These two scores correlated gave an r of $+.49$; corrected by the Spearman-Brown formula with $N=5$ to compensate for the length of the test, this becomes $+.83$. Thus it is seen that these words are representative of the list as a whole and aside from the shortening of the list present a reliability as administered equal to that of the test as a whole. Disturbances on these 19 words were plotted separately for the administrations in the Jung and the Kent-Rosanoff. Each item was then scored as a reversal or a nonreversal. Regardless of the type of disturbance, if the item showed a disturbance in one administration and not in the other, it was scored as a reversal; if no disturbances were marked for the item or if disturbances were marked in both administrations, it was scored as a nonreversal. If the first hypothesis here presented were true, and a specific word called up a specific conflict situation thus leading to a disturbance, the percentage of reversal would approximate 0 since the same word would call up the same situation again thus leading to disturbances in both administrations. Chance would be approximately 50 per cent. The average percentage of reversal found in this study was 42.9 per cent. This approximates chance much more closely than the value expected if this hypothesis were true.

From these data we conclude that the process of association represents a sample of the amount of mental disturbance rather than a specific conflict situation suggested by a specific stimulus word, and that the subject within the limits of the reliability of the technique and regardless of the word list used will show a given number of disturbances per 100 words. Thus the word list may be better thought of as a random sample of a process which is easily disorganized rather than as a list containing a given number of words "critical" to a given subject. This would indicate that the association-motor technique represents a good method of sampling the amount of mental disturbances at least for group purposes.

The second half of Table 2 presents those comparisons which have to do with the factor of practice effects. These are the Jung list administered first with the Jung list administered second, the Kent-Rosanoff list administered first with the Kent-Rosanoff list administered second, and the total of all first tests with the total of all second tests. From Table 2 it will be seen that all differences are positive but one. However, the critical ratios are all too low to admit of statistical reliability, ranging from 0.05 to 2.00. Since all the differences but one are in the same direction we conclude that there is a slight practice effect which is, however, too small to be significant.

CONCLUSIONS.

1. Within the limits of the group defined here and with fairly normal individuals, group scores on the association-motor test are independent of the word list used, provided the words are common in the language and their meaning is known to the subject.

2. With an interval of one day between testings there is a slight practice effect which is, however, too small to be statistically significant.

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THE DISCLOSURE OF FOSTER-PARENTAGE TO A BOY.

Behavior Disorders and Other Psychological Problems Resulting.*

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The purpose of this communication is to present some of the readily ascertainable psychological problems incident to a child's learning that the persons he has always assumed to be his real parents are only foster parents. The examples presented are culled from an unselected group of 250 admissions to the New York State Training School for Boys. The formula followed by these cases is a fairly uniform one; an illegitimate child is deserted in infancy by its parents, and adopted by strangers who bring it up as a child of their own. At some later date in childhood, usually near early puberty, the truth is somehow revealed. The revelation may or may not be preceded by a preliminary period of doubt in the child's mind. Certain psychological events occur, the most characteristic behavior pattern resulting being desertion of the home. Specific problems are best discussed in direct relationship to the cases.

Case 1.—J. B. a colored boy of 14.

Family Background.—The mother came to Brooklyn from Virginia in 1921. As the result of illicit sexual relations, she became pregnant. Nothing is known about the father except that he deserted before the child was born. When the boy was two months old the mother boarded him out to the present foster mother. The mother saw the boy several times until he was eight months old, although she never showed any fondness for him. The mother then disappeared, and nothing definite has been known of her since. The foster mother is a negress with Indian blood on the maternal side. She was brought up as an orphan and was treated very cruelly in childhood. She married at 19, lived happily with her husband, and had four children. Three sons are living and married; one daughter lives at home and helps support the home by working in a laundry. Her husband died, and she remarried. About six years ago, the second husband became interested in another woman and

* From the Medical and Research Department, conducted by the New York Neurological Institute, at the New York State Training School for Boys, State School, Orange County, N. Y.

deserted, although he visits the home very occasionally and sometimes contributes to its support. The home is poverty stricken and unsanitary, though not on relief. There is a boarder. The foster mother is ill with heart disease and spends much time in bed.

Boy's Development.—The pregnancy and delivery of our subject were normal. He was breast fed until four months of age and then put on the bottle. He was a quiet baby and child who obeyed well, showed no aggressive tendencies, but had occasional fits of crying. Though the mother showed no affection, the foster parents did. He was always of a quiet disposition. He began school at six, and reached the fifth grade. His behavior and attitude in school were always satisfactory. He mingled poorly with other boys, was known as a "lone wolf," and his chief diversion was the movies. He suffered an injury to his spine at the age of eight, and was kept out of school for one year. During this time, the foster mother was very solicitous about his health. He suffered the usual childhood diseases and a tonsillectomy and appendectomy.

The Boy's Problem.—The boy was eight when the step-father deserted. This did not affect the behavior of the boy though the economic level of the family dropped then. When he was 12, the foster mother revealed to the boy what she knew of his parentage. Shortly after this, he began to desert home, be dishonest, steal small amounts of money from home, and was a truant from school. He was put on probation by the Children's Court, but violated probation by stealing some money from his foster mother. He was then committed to the New York State Training School for Boys.

Institutional Findings.—Examination disclosed no physical defects, except a spina bifida at the fifth lumbar vertebra shown by X-ray. He had an I. Q. of 90 and an E. Q. of 91, with an educational achievement of seventh grade work, two years ahead of his school placement. Interviews disclosed a friendly, mild-mannered boy. There were no signs of psychosis and no overt neurotic symptoms. He said that he first began to suspect that his parents were not his own when he was nine, but was not certain until his foster mother told him. He definitely stated that he began stealing after he learned this. He felt very resentful at not having been told something so important before. He often had fantasies of his real mother returning to claim him. Shortly before the first desertion, he suddenly got the idea that his foster parents didn't want him. He had no place to go, but he deserted.

Comment.—This boy demonstrates: (a) the preliminary period of uncertainty of parentage; (b) resentment at not having been previously informed of a fact of tremendous importance; (c) fantasies of the real mother coming to claim him; (d) onset of anti-social behavior after the disclosure; (e) onset of home desertions after the disclosure, the desertions being somewhat irrational, with no definite conscious purpose or place; (f) fantasies of the foster parents not wanting him, a belief definitely not justified by the foster parents' real attitude.

CASE 2.—R. W. a colored boy of 16:

Family Background.—The mother was a Virginia negress who became impregnated while on a visit to New York City. Nothing is known of the father. When the mother became aware of her pregnancy, she left home and went to Washington, D. C., without informing her parents of her real reason for doing so. She had no love for the child, and regarded it as the great mistake of her life. The mother took care of the child for the first 18 months, and then because of illness gave it to a sister who cared for it for one year. At the end of the year, it was given into the custody of the present foster mother, who assumed the rôle of mother. The boy looked upon these people as his real parents, and seems to have adjusted well. However, the foster father became ill with tuberculosis, the home was broken up, and the boy was sent at the age of six, back to the South to live with his grandparents. Here he stayed until he was nine. He developed a great attachment to his grandmother, learned how to cook, and spent much time playing with dolls. His real mother was at that time living in the same home with him, but he was told that she was his aunt. She died of tuberculosis when our subject was eight years old. It was during this time that it was hinted to him that the people he took to be his parents in New York City were not really so, but he never could feel certain. From that time on, he was always in some doubt and a good deal of anxiety, though he continued to look on the foster mother as mother. The usual terms of address were always "mother" and "son." At the age of nine he was sent back to New York to live with his "mother," who had remarried after the death of her first husband. Here he lived until his present difficulties began. The second husband was a kind, friendly man, a laborer, and always did his best to help him. The economic level of the home was not very high, but self-sustaining and clean.

Boy's Development.—Nothing is known of the pregnancy or delivery. He was bottle fed. At the age of three he had several convulsions, was treated in a hospital, and never suffered from convulsions thereafter. Even as a very young child, he was known to talk a great deal to himself. After the age of six, he would often describe having seen strange animals and talking with strange men. He was early interested in dramatics, acting, and would often improvise a stage in the loft of the barn. In New York, he did fairly well in school, received grades of B, and reached the eighth grade. He refused the company of either boys or girls, shunned athletics, was interested in dramatics and choir singing. He was known to do ballet dancing in the privacy of his own room when he felt he was alone in the house.

The Boy's Problem.—At about the age of 14 his foster parents began to have suspicions of homosexual activity on the part of the boy. He would be seen in the company of older men, would suddenly disappear for a few hours and return with several dollars, he was seen entering apartment houses in the company of men. He was decidedly effeminate in mannerisms, speech and tastes. His foster mother and father tried kindly argument and persuasion without avail in an attempt to direct him sexually. At the age of 15, syphilitic lesions were found in his mouth and rectum. Treatment was started. Shortly thereafter, he accidentally saw his birth certificate, and learned definitely that

the people he was living with were not his real parents. This was the proof of his suspicions and doubts, and was a terrible blow. The chief emotional feeling was one of resentment at having been deliberately misled. He became angry and hostile, but at the same time began to develop in a melodramatic way the ideas that he was a burden to his foster parents and that nobody wanted him. He often threatened suicide. One month later he ran away, was apprehended some days later and persistently deserted home four more times. He repeated each time that he was not going to stay at home and would continue to desert. He was then committed to the New York State Training School for Boys.

Institutional Findings.—Examination showed no system disease. A blood Wassermann was negative on four occasions. Neurological examination showed minimal scattered signs, probably the residue of an old inflammatory process in infancy. The I. Q. was 83. The E. Q. was 79 with a sixth grade educational achievement. Interviews disclosed an effeminate boy who was hostile and uncooperative. He refused to abide by the ordinary regulations. He mingled poorly with other boys, and sought out the company of another homosexual boy. Nothing unusual about his speech production. Emotionally he varied, often cheerful and happy, at other times dramatically depressed. He expressed an enormous self interest, had no interest in anybody else, stated he would never love anyone. Preferred to be alone. Felt that nobody liked him, and the moment any one balked him, they were at once labeled "enemies." He railed against the cruelty of his foster father. He felt that his foster parents had done something very unjust because they did not disclose the most important thing there could be to a boy, namely his parentage. That was why he deserted, and he never wanted to live with them again.

Comment.—This boy's problems are not so simple. His early life was quite unsettled and in addition there is the definite problem of overt homosexuality. We do not have sufficient material to offer an etiological solution of his sexual inversion, but certain things pertain to our problem. This boy presents: (a) a preliminary period of uncertainty regarding parentage; (b) resentment at not having been sooner informed; (c) persistent home desertions after this disclosure. In addition to the above, this boy had certain other ideas, which are, however, related to his highly withdrawn, egocentric and hostile attitude. He tended to adopt a paranoid attitude. He spoke of the people about him being his enemies, nobody wants him or loves him. He spoke of suicide in a melodramatic way. This is a boy who is perhaps generally destined to react in a paranoid manner, faced with the more specific problem which concerns us here. His specific reactions lie within the general framework of this attitude and are somewhat molded by it.

CASE 3.—J. L. a white boy of 15.

Family Background.—Nothing is known of the boy's real parents. He was adopted from a foundling home at the age of three. Both parents are immigrant Italians who came to the United States before they were 20. The father is an unintelligent, friendly, cheerful man who owns his own ice business. Very sincere, cooperative and interested in the boy. The mother has been recently working in a factory to save money for the boy's future care. Somewhat moralistic. Both parents have always been very ambitious and very indulgent with regard to the boy and never disciplined him severely. The home is good, the rooms are large, well kept and well furnished. The neighborhood is good, not crowded, and populated by middle class Italians.

Boy's Development.—Nothing is known of the pregnancy or delivery. He suffered the usual childhood illnesses. He always mingled well with other boys and engaged in sports. His conduct in school has been variable. In the last few years, it has not been very good. He repeated both grades 7A and 7B.

Boy's Problems.—The first court appearance was about one year before commitment when the parents brought him into court because he was uncontrollable and deserting home. His behavior had been especially bad during the last year, but for the two years previous, the behavior problem had been slowly developing.

For years, he had heard rumors that he was an adopted child but no one had ever definitely proven it to him. He does not look like an Italian. Although his attitude to his parents had always been one of respect, he began to gamble, be incorrigible, steal from home and persistently run away. One year ago, his father overheard the boy tell someone that his parents were not really his own. This provoked a violent outburst and the father produced a birth certificate which the boy, however, believes is a forgery. Following this occasion of the problem coming out into the open, the boy's behavior became markedly worse. He violated probation and was committed to the New York State Training School for Boys.

Institutional Findings.—Examination disclosed no physical defects. The I. Q. was 98, the E. Q. was 96 with an eighth grade educational achievement. He was especially poor in arithmetic and language usage. He was erratic, irresponsible, moderately aggressive. Interviews disclosed a quiet cooperative boy who had no conscious feeling of guilt over his stealing or misbehavior. He described the pleasures of tormenting shopkeepers and the enjoyment and excitement when stealing. He became emotionally disturbed when discussing his parentage. He stated, "Maybe they are, maybe they aren't." The reason he gave for running away was fear of punishment after stealing from home. He described vivid fantasy of adventure and glory. On his frequent runaway escapades, he never had any definite place to go nor were there definite incidents which provoked the individual runaways.

Comment.—This boy was for years faced with the question of his parentage. There are no other discernible causes for a behavior disorder either in the environment or in the family situation. The behavior disorder was rather diffuse in its manifesta-

tions. When the problem was brought into the open, his foster father failed to convince him. The boy's appearance was decidedly different from that of his parents. He discussed all his affairs casually except the matter of his parentage. The boy demonstrates: (a) a still present doubt as to his parentage; (b) a diffuse type of behavior disorder in which deserting home is a prominent symptom; (c) runaway episodes which are unprovoked by external situations; (d) an aggravation of the disturbance when the problem came to the surface. It is interesting that when interviewed, this boy expressed no resentment or hostility to his parents even though the problem of parentage was admittedly perplexing him. His conscious attitude to them was one of love and affection.

CASE 4.—L. McQ. a colored boy of 16.

Family Background.—The father's name is known, but he disappeared and has not been seen since the birth of the child. The mother was unmarried and gave birth to the child when she was a young girl. She boarded the child out in early infancy, and saw him only occasionally until he was two years of age. She left the South then, and the foster mother knows vaguely of some northern city where the mother might be, but the mother never saw her son after that. At the time the foster mother took the boy she was a widow of 10 years' standing, and had a 15-year-old son. She was a hotel domestic, and took the child with her when she went out to work. When the boy was nine she moved to New York and continued doing the same kind of work. When the boy was 11 she joined the followers of Father Divine. The present home of the foster mother is shabby, dirty, but self-supporting and not on relief.

Boy's Development.—Nothing is known of the pregnancy or the delivery. The baby was unusually fat and started walking late. There was a severe pulmonary illness at the age of one and the usual childhood illnesses. Schooling in the South was haphazard.

The Boy's Problem.—After the mother joined the Father Divine group she felt that she had to tell the truth in everything, so she decided to tell the boy that she was not really his mother. She did this when the boy was 11, and has ever since felt that it was a terrible error, because she has never been able to control him since. She stated that after that he was disobedient, became a truant, stayed away from home, and was generally incorrigible. She tried to impress the teachings of Father Divine on him, but without effect. There were, however, some external factors operative at the same time. When the mother joined the Father Divine cult, she assumed a job with irregular hours, making her supervision of the boy quite poor. When the boy was 13, they lived apart for a period of five months because the cult regulations demanded that males and females should live separately. Reports from the city schools stated that he was sullen, disrespectful, seemed to be carrying a grudge, and was a truant. He was an energetic boy who always managed to

earn money by working whenever he wanted to. The foster mother finally had him committed to the New York State Training School for Boys.

Institutional Findings.—Examination disclosed no physical defects. The I. Q. was 74; the E. Q. was 74, with an educational achievement of sixth grade work. He was resentful to routine, avoided work, and was somewhat aggressive. Interviews disclosed a friendly boy who had difficulties in intellectual comprehension. His answers to questions were vague, indefinite and uncertain. His memory was poor. He had no insight into the anti-social nature of some of his acts. He disliked school and gave a poor history of himself. He stated that his real mother had been sending him letters for a long time. This is probably fantasy. He did not verbalize any emotional reaction to having learned about his parentage. He stated without emotion that he would rather live with his mother than his foster mother. He ran away from home to avoid punishment. He did not bear out the strongly felt conviction that, to the foster mother's mind, the disclosure of his parentage was her great mistake, and marked the onset of her loss of control over the boy.

Comment.—This boy is dull, with definite disability in comprehension and verbalization. Certain external circumstances aided the development of his difficulties. He demonstrates the development of a diffuse behavior disorder definitely following the disclosure of his parentage. In interview, the boy did not confirm the foster mother's firm belief in the cause of her abrupt loss of authority over him. However, he was of about borderline intelligence, and gave a poor story of all his affairs. This boy demonstrates: (a) an abrupt development of a diffuse type of behavior disorder in which home desertion was a prominent feature following the disclosure; (b) the fantasy of communication with the real, but absent, parent; (c) complete lack of insight and understanding in a borderline mental defective.

Case 5.—R. A. a colored boy of 14.

Family Background.—The boy was the product of an illegitimate union between a widow who had 12 children by her marriage and a man who deserted when the baby was born. The mother died following an accident when the boy was two years of age. He was then taken by a distant cousin who was married and childless, and was brought up as her own son in a semi-rural community in New Jersey. When he was 10, the cousin gave birth to a child of her own. Shortly thereafter, she felt that the boy was a nuisance and a bother, and at the age of 12, insisted that he be cared for by two of his half-sisters who were living in New York City. The two unmarried sisters took him into their home. It was a small apartment in a congested Harlem district. One of the sisters had an illegitimate baby. The older sister who assumed guardianship was sadistic and hostile, and very unsympathetic with any of the boy's problems.

Boy's Development.—The pregnancy and delivery were normal. He was bottle fed, had the usual childhood diseases, and fractured one arm in several falls. He suffered from night terrors until the age of four, and was a thumb sucker until eight. He was an attractive, popular boy, and was quiet and obedient in the home. In school he was tractable, with no problem of truancy until he was transferred from standard 4A grade to an ungraded class.

The Boy's Problem.—Until the age of eight, he looked upon his foster parents as his real parents. They were very attentive and treated him as their "own child." At that time, some boys in the neighborhood told him that he was only an adopted boy. He went to his foster-mother and asked her. She explained the truth to him. This was quite a shock to him, and he thought about his real parents every day, and often wondered what they looked like. However, there was no change in the boy's external behavior, and his foster parents continued to treat him kindly. At the age of 10 the baby was born to his foster parents. It was after this that the latter began to try to rid themselves of our subject. At the age of 12 he went to live with his sisters and his adjustment was uniformly poor. He was mistreated and because of his general feeling of dejection and unhappiness, tried on three occasions to commit suicide. He would stay out late at night, did not obey his sister, and was generally incorrigible. However, there is no record of anti-social behavior in the form of stealing. He frequently ran away from home, and when brought back, would refuse to enter the house. The sister was anxious to rid herself of the boy and had him committed to the New York State Training School for Boys.

Institutional Findings.—Examination disclosed no physical defects. The I. Q. was 67. The E. Q. was 64, with an educational achievement at the third grade level. There was a severe spelling deficiency. His adjustment in our school and cottages was poor; a constant troublemaker. Interviews disclosed a glib, talkative youngster who spoke in a jerky manner. He cried as he discussed the problem of his parentage. He stated that he was very happy living with his foster parents, and that it took him a long time to believe that they were really not his own. He could not recall the occasion of the birth of his foster brother. He stated that his foster parents did not want to send him away, but that he wanted to go to New York. However, in New York, he was hopeless and dissatisfied with his sister.

Comment.—This boy is a high grade moron, and the truancy from school can be attributed to that fact. This boy did not develop any behavior disorder on learning of his real parentage, but only after his foster parents rid themselves of him. No doubt their own attitude to him suffered a marked change on the birth of their own child. He demonstrates: (a) the extreme difficulty and delay in accepting the validity of the all important truth about the parentage, (b) fantasies of what the real parents looked like, (c) repression of the incident of the birth of the real son to the foster parents,

(d) the difficulty of adjusting to other parent substitutes under other conditions.

CASE 6.—W. D. a colored boy of 15.

Family Background.—The boy was born out of wedlock. When nine months old, the father took him away from the mother. He subsequently married another woman and had another son and two daughters. Our subject was raised as the oldest son of the family. The home was clean, but in a congested Negro district.

Boy's Development.—Nothing is known of the pregnancy or delivery. He suffered the usual childhood diseases. He attended school to grade 8A, though he was a definite problem of truancy. His conduct at home was satisfactory, he was always given spending money within reason. His father wanted him to be a lawyer. He did not participate in organized recreational activity.

The Boy's Problem.—When the boy was 10, his real mother suddenly appeared in the school yard and tried to grab him. She was unable to secure the boy, and tried to regain the custody of him by court action, but failed. The boy stated that his school difficulty began at about this time. When he was 13, his father told him that his real mother had tried to poison him as an infant. He told him this, "in case I die I want you to know what kind of a woman your mother is." At the age of 14, he stole 60 cents in an elevated station. Later he robbed an elevated station again. Although his behavior at home continued to be good, his father had him committed to the New York State Training School for Boys.

Institutional Findings.—Examination disclosed no physical defects. Interviews showed the boy to be tense; he looked aside when speaking. He often paused suddenly in the midst of talking and seemed to be in a trance. He described auditory and visual hallucinations, he saw visions, heard music and poems. His conscience often spoke to him and told him what to do. He would talk things over with his conscience, sometimes he obeyed it and sometimes not. He was highly superstitious and had faith in certain numbers. He had a hypertrophied interest in money and the power of money. He wanted to have money to be a powerful person so that his foster mother would think he was the most powerful person in the world. He always felt badly because his real mother didn't want him. He was very evasive in discussing his parentage. At first he said his foster mother was his real mother. Usual routine questions were answered coherently and logically, but to some questions, his answers were irrelevant and seemed to have no logical relationship. In response to direct questions about parentage: Q. "Did you behave differently after you learned that your mother was not really your own mother?" A. "Some of my friends do not understand why I act the way I do."

Comment.—This last question and answer demonstrate nicely a superficial irrelevance which can be readily dissipated by a knowledge of the boy's problems. This boy had obsessive and schizophrenic symptoms. The point of interest here is the perti-

nence which the problem of the boy's parentage had to the destruction of his conversational forms, as evidenced by the break in the conscious, logical relationship between answer and question. In other words, this problem, among his many others, was a sufficient source of anxiety to operate as an emotional block in destroying the logicality of some segments of his conscious thinking.

CASE 7.—F. W. a colored boy of 14.

Background and Problem.—An illegitimate child deserted by both parents when he was two weeks old. He was brought up by foster parents until the age of 11. We do not know whether he was brought up as a foster-child or led to believe he was a real son only to learn the truth later. However, he became a severe problem of home desertion and truancy and was committed to the Brace Memorial Farm. He continually escaped, was an unwholesome influence on other boys, had an undue interest in sex, and was subject to violent fits of temper and vicious burst of aggression. At the end of three years, his foster parents refused to take him back and he was committed to the New York State Training School for Boys.

Institutional Findings.—Physical examination disclosed chronic tonsillitis, but otherwise no defects. The I. Q. was 88, the E. Q. was 76 with a fourth grade educational achievement. He was a constant discipline problem and had a vicious temper. At first, interviews disclosed him to be cheerful and friendly, but as time went on, he became uncooperative and hostile. He had definite paranoid ideas and ideas of reference. He felt that people looked at him in a peculiar way, that he was being tested out, that he was being framed. He experienced vivid fantasies, usually of having sexual intercourse. He had fantasies of a girl coming to him and saying that she was his sister and that she led him to his mother who begged his forgiveness for having deserted him. He forgave her and everyone was happy. The boy was in tears as he described this fantasy. He carefully refrained from condemning his mother for deserting him. "I don't know the conditions so I can't judge."

Comment.—While this case does not fit exactly into the pattern of those previously mentioned, it is included because of the interesting fantasy production, that of finding his mother and her begging for forgiveness.

GENERAL COMMENT.

Several points of accessory interest should be noted. All but one of the boys were colored. They were all brought up either as the only child or else as a much younger child than any of the other foster-siblings, with one exception. This would certainly tend to make the shock of the disclosure especially great.

From the standpoint of general symptomatology, some of these cases demonstrate a period of preliminary doubt concerning the parentage, or a persistence of the doubt even after the problem has been consciously faced. There may be marked difficulty of adjustment to other parent substitutes and subsequent foster homes.

Conscious fantasy formation is a prominent symptom. This may be in the nature of the mother coming to claim the son, or of communication with the parent, or of speculative fantasies concerning the possible appearance of the parents. There may be fantasies of finding the mother, and atonement and forgiveness. Or there may be fantasies of the parents not wanting the child. None of these boys demonstrated any conscious fantasy of revenge for having been deserted.

The outstanding subjective attitude adopted after the disclosure is resentment to the foster parents, and the most characteristic feature of the behavior pattern is desertion of the home. There may be an aggravation of a pre-existing behavior disorder, or behavior disorder may be newly precipitated. The home desertion may be motivated by conscious resentment, or may be purposeless and apparently irrational. It is interesting to note that the boy J. L. did not have any resentment to his foster parents, and F. W. did not have any hostility to his real mother. Both boys were careful to state that position. It would be easy to assume that a strong hostility was repressed and then redirected in an anti-social manner. Note should be made, in all the runaways, of the absence of any conscious motive to seek out and find the real parents. One could reasonably assume that such a motive might exist in these boys, even though repressed from consciousness.

In problems of a more severe nature, paranoid and schizophrenic reactions, one can note an occasional one of the above symptoms within the framework of the more malignant picture. In mental defectives, one may be faced by a behavior disturbance, with little or no subjective reflection of the problem.

It is no doubt true that many normal children developing in normal families often have transient fantasies of doubt concerning their parentage. This is probably due to transient hostilities or feelings of rejection which may be generated even in the course of the most smoothly functioning family unit. Under ordinary

circumstances, though, the fundamental security and love relationships in a normal home will always suffice to dissipate these fantasies. It is quite possible that neighbors and relatives can accidentally drop hints to an adopted child which might set a train of doubting fantasy going; or that the foster parents, in spite of strong love for a foster child may still be unable to prevent an alert child from feeling a certain lack of fundamental security in the relationship. Be that as it may, a good percentage of the cases here cited demonstrated this doubt.

The confirmation of the doubt is of course the major trauma. The emotional security within the family unit is badly shaken, and the attitudes to authority and society suffer. Perhaps the most pernicious result is the development of an ambivalent attitude to the foster parents, love for the past care and affection, and hate for the withdrawal of the security of that relationship. This resentment and hostility may be expressed by acts against the foster parents or against society.

The resentment to the foster parents or parent may be completely repressed and find its overt expression in anti-social behavior.

Summary.

1. The problem of the disclosure of foster parentage is discussed and seven cases are presented.

2. The general symptomatology is presented, and its occasional interrelationship with definite mental disease briefly touched upon.

Proceedings of Societies.

THE AMERICAN PSYCHIATRIC ASSOCIATION

PROCEEDINGS NINETY-THIRD ANNUAL MEETING.

HOTEL WILLIAM PENN, PITTSBURGH, PA.,
MAY 10-14, 1937.

TUESDAY MORNING SESSION.
MAY 11, 1937.

The ninety-third annual meeting of The American Psychiatric Association convened in the Hotel William Penn, Pittsburgh, Pa., at ten-ten o'clock, the President, Dr. C. Macfie Campbell, of Boston, Mass., presiding.

PRESIDENT CAMPBELL.—I have the honor of calling to order the ninety-third annual meeting of The American Psychiatric Association.

I shall ask the Reverend Bernard C. Clausen, of the First Baptist Church, to deliver the invocation.

REVEREND BERNARD C. CLAUSEN.—By the faith that the wild flower shows as it blooms unbidden, by the calm of the river that flows to a goal that is hidden, by the strength of a tree as it clings to its deep foundation, by the courage of birds' light wings on their long migration, beautiful spirit of trust that abides in nature's breath, teach us how to confine and live our lives and to rest. Amen.

PRESIDENT CAMPBELL.—Our colleagues of Allegheny County and of Pittsburgh have been good enough to send representatives to greet the Association. I have pleasure in asking the President of the Allegheny County Medical Society to address the Association, Dr. Sidney A. Chalfant.

DR. SIDNEY A. CHALFANT.—*Mr. President, Members of The American Psychiatric Association and Friends:* There are certain compensations for being elected to office sometimes, and one of them today is the pleasure it gives me as President of the Allegheny County Medical Society to welcome you to Pittsburgh. We assure you that we are anxious to make your stay as pleasant as possible. Your program would indicate that your meetings will be both profitable and stimulating.

Pittsburgh has for years been the center of the steel and coal industries. Many of the men who have made their fortunes in this city have gone East, to New York, Philadelphia, and other cities, and have there given their

funds to institutions in the East. Some of the men who have gone East may not have been much credit to us, but there was opened last week an outstanding institution in this city, given by Pittsburgh men. I refer especially to Mellon Institute of Industrial Research. I am quite sure that a trip to the Mellon Institute will be well worth while. They are solving many problems of science and industry, to the help of the industrial world.

We are also proud of our hospitals, and they possibly, although they are general hospitals, might be of some interest to you. Being associated with the new Allegheny General, I would especially speak for that institution which is the most recent one in the city.

We shall have soon, and I think it will be started promptly, a new psychiatric hospital, a state hospital in the city, which will be for the treatment and diagnosis of incipient cases.

If we have a clear day and a clear night, and we do have them sometimes in Pittsburgh, it would be quite worth your while to make a short trip up to Mount Washington. It will give you a view of the city that is unique.

We hope that when you leave Pittsburgh, you will take with you a recollection of a pleasant time and the desire to come back to see us.

PRESIDENT CAMPBELL.—The President of the Academy of Medicine of Pittsburgh has come also to greet the Association.

I have great pleasure in presenting Dr. James K. Everhart.

DR. JAMES K. EVERHART.—*Dr. Campbell, Members of The American Psychiatric Association and Guests:* At the time I was requested to say a few words at this meeting, it was intimated to me, very delicately of course, that I might, if I liked, make my remarks very brief, that the really important part of this program after all is the address of your President. I know that you will all feel relieved that I intend to follow that suggestion.

Any organization which has attained its 93d birthday has a claim to distinction. When to this is added your history, your record of achievement and your service to psychiatry with all that you have accomplished, it seems to me that to distinction can be added fame.

We honor The American Psychiatric Association for what it is and for the prospects of future and even greater accomplishments. You are here not by accident at all nor to be entertained nor yet merely to entertain, but because of a deep purpose to further the service of psychiatry which is another way of saying service to general medicine and thereby service to mankind.

It gives me no small degree of pleasure to extend to you all a very cordial and whole-hearted welcome from the Pittsburgh Academy of Medicine. For many years a number of our members have been affiliated with The American Psychiatric Association and have taken active part in your deliberations. So to all of you, whether members or guests, we want to bid a hearty welcome. We hope that reflections upon this year's meeting will always bring to you pleasant and delightful memories.

PRESIDENT CAMPBELL.—I shall ask Dr. Chapman, President-Elect, to respond to these cordial words of welcome from our two colleagues. Dr. Chapman!

DR. ROSS MCC. CHAPMAN.—May I thank you, gentlemen, on behalf of The American Psychiatric Association, for your warm words of welcome. We appreciate deeply the greetings of the Allegheny County Medical Society and of the Academy of Medicine and feel sure that we shall take away from your city impressions that are lasting, memories that are most happy. We who come from a distance know Pittsburgh as a great industrial center, but we also know of it as a city of wide educational interests and a city of broad culture. Again, I thank you!

PRESIDENT CAMPBELL.—We would like now to have reports from the chairmen of two committees, the first from the Chairman of the Committee on Arrangements, Dr. Frederick.

Dr. John N. Frederick, Chairman of the Committee on Arrangements made several announcements regarding the program.

PRESIDENT CAMPBELL.—I should like to ask the Chairman of the Committee on Program, Dr. Hall, to make any communication which he thinks fit to make.

DR. ROSCOE W. HALL.—*Mr. President, Members of the Association and Guests:* There is one change and one addition to be noted. If you will turn to page 32 of the program, the meeting this afternoon in Section III, Studies from the Laboratory, the paper by Dr. Marshall on "Psychoallergic Desensitization by Non-Specific Means," through an unfortunate misunderstanding will not be presented. It will, therefore, be scratched. In its place will be the paper by Dr. Emerick Friedman, which is described on page 79 under the additional papers to be read by title. This paper, "The Irritative Therapy of Schizophrenia," will be discussed by Dr. Solomon Katzenelbogen and Dr. Meyer Amdur.

The addition. By request, there will be a round table on hypoglycemia, the moderator of which will be Dr. Bernard Glueck, and among the discussants will be Dr. Manfred Sakel and Dr. John Ross. This round table will be held at the same hour as the other round tables on Thursday evening at seven o'clock.

PRESIDENT CAMPBELL.—The next piece of business is the report by the Secretary-Treasurer of the Council and his report as Secretary-Treasurer. Dr. Sandy!

SECRETARY SANDY.—The report of the Council.

The Council met at the William Penn Hotel, Pittsburgh, May 10, 1937, at 7.30 p. m. Fifteen members were present, President Campbell presiding.

Dr. Appleton H. Pierce, at his request, was afforded an opportunity to make a statement as to the present policy of requiring an applicant for reinstatement after being dropped for non-payment of dues to pay dues for

the whole period of time during which he had not been a member. After much discussion, further action was postponed for consideration at a later meeting of the Council.

The Secretary reported changes in membership as follows: Three Members and three Fellows have resigned, two of the Members and one Fellow owing dues for 1937. The Council voted to accept the resignations remitting the 1937 dues in the cases of the two Members and one Fellow.

It was recommended that service be discontinued including the JOURNAL in the case of 10 Fellows, seven Members and three Associate Members two years in arrears, a letter to be sent each member notifying him of the action taken.

In view of the illness of Dr. Arthur S. Hamilton, his long membership and other circumstances, the Council voted to remit his dues, discontinue the JOURNAL, but to retain his name in the list of members.

The Council voted to drop from the Association nine Fellows and nine Members three years in arrears in dues, two notices and a special letter having been sent to them.

The Council approved for Life Membership the following who were elected to Active Membership in 1907:

Dr. Charles W. Burr, Philadelphia, Pa.

Dr. L. Vernon Briggs, Boston, Mass.

Dr. Earl H. Campbell, Newberry, Mich.

Dr. William W. Richardson, Mercer, Pa.

Dr. Cheney presented the report of the Board of Examiners, based upon which the Council voted to recommend for election 31 applicants for Associate membership, 159 applicants for membership, one Member for reinstatement, 12 to be transferred from Associate Member to Member, and 11 to be transferred from Member to Fellow. No one was recommended for honorary membership.

Dr. Dayton, Chairman of the Committee on Nomenclature and Statistics, submitted supplementary paragraphs to be added to the report of his committee in regard to the problem of a more satisfactory mental base for the determination of intelligence quotients in adults. The amended report of the Committee on Nomenclature and Statistics together with the reports of the following committees, namely, the Executive, Research, Psychiatric Nursing, Standards and Policies, and Legal Aspects of Psychiatry, were accepted and approved for printing with the proceedings.

Consideration of the reports of the Committees on Public Education, Psychiatric Social Service and Psychiatry and Medical Education was postponed for further discussion.

No report was filed by the Committee on Ethics.

The Council voted that the incoming President shall designate a successor to Dr. Farr on the National Research Council and also a representative to the American Association for the Advancement of Science.

Upon motion of Dr. Overholser, seconded by Dr. Treadway, the Council authorized the incoming President to appoint such Fellows, not to exceed five

in number, as may plan to attend the Second International Congress for Mental Hygiene to represent the Association.

The application of the Connecticut Society of Psychiatry for affiliation with the Association was accepted by the Council, upon motion of Dr. Cheney. seconded by Dr. Brill.

After considerable discussion, upon motion of Dr. Cheney, seconded by Dr. Stevenson, the question of a certificate of membership for the various classes of members was postponed until a further demand was received for a consideration of the same. In the meantime, at the suggestion of Dr. Jackson, it was recommended that the Association issue a card such as is used by the American Medical Association indicating membership in good standing.

The Secretary reported that upon investigation it was found inadvisable and impractical at this time to establish a trust fund of the resources of the Association.

After a general discussion of the suggestion of the Executive Committee, the Council voted not to raise the dues of the member class.

The Secretary read a letter of appreciation from Dr. Wagner-Jauregg for the congratulations of the members on his eightieth birthday.

The Secretary also read a letter from Dr. Ley, of Belgium, expressing his deepest condolence for the loss of the distinguished member, Dr. White.

The Council voted to acknowledge a communication of the Mutual Liability Insurance Company and that it be tabled.

Dr. Overholser read the following resolution, which was passed by the Council for recommendation to the Association:

"WHEREAS, Several organizations interested in promoting human welfare have manifested a deep interest in research into the causation, prevention and treatment of mental diseases and have furnished substantial financial aid to the prosecution of such research; and,

"WHEREAS, Certain legislative bodies and others interested, including the Josiah Macy, Jr., Foundation, the Rockefeller Foundation, the Markle Foundation, and the Supreme Council of the Scottish Rite of Free Masonry for the Northern Masonic Jurisdiction, have been outstanding in giving moral and financial support to such research; be it

"*Resolved*, That The American Psychiatric Association on behalf of American psychiatry hereby record its gratitude for the valuable service rendered to it because of psychiatric research by these organizations and that it heartily endorse the importance of studies looking to a solution of the problems of mental disease."

The Council then informally discussed the invitations from various places for the 1938 meeting, it being decided that only those would be considered which came from members or groups of members. Dr. Glenn Myers spoke at length in regard to the invitations received from the Los Angeles and San Francisco group. Further consideration was postponed for a later meeting of the Council, at which time representatives from other places will be heard.

The meeting adjourned at 11.10 p. m.

PRESIDENT CAMPBELL.—The report of the Council is before you. What is your wish with regard to this report?

It was regularly moved, seconded and carried, that the report of the Council be adopted.

PRESIDENT CAMPBELL.—I shall call on the Secretary for his report as Secretary.

SECRETARY SANDY.—The following is a statement of the membership of The American Psychiatric Association as of April 15, 1937—I shall condense this quite a bit, the report as a whole being printed in the proceedings. The present number of Honorary Members is 19; Life Members 59; Corresponding Members 4; Fellows 887; Members 684; Associate Members 79.

The total membership April 15, 1936, was 1661. The total membership April 15, 1937, was 1732, or, a gain of 71.

PRESIDENT CAMPBELL.—What is your wish in regard to this report of the Secretary?

It was regularly moved, seconded and carried, that the Secretary's report be adopted.

PRESIDENT CAMPBELL.—Dr. Sandy will present the report of the Treasurer.

SECRETARY SANDY.—The following statement of the Treasurer is based upon the report of a certified public accountant. I shall also condense this, the full report being printed in the proceedings.

Total balance April 16, 1936, was $28,569.21; total receipts this year were $14,794.23, making a total of $43,363.44. The total disbursements were $14,083.67, leaving a total balance of $29,279.77.

In the account of the AMERICAN JOURNAL OF PSYCHIATRY there was a bank balance April 16, 1937, of $1,832.47; the total receipts for the year were $8,970.61, making a total of $10,803.08. The total disbursements of the AMERICAN JOURNAL OF PSYCHIATRY were $9,438.67, leaving a balance of $1,364.41, or the total cash resources of the Association were $30,644.18.

PRESIDENT CAMPBELL.—The report of the Treasurer has been gone over by public accountants, still it has to be submitted to the Auditors of the Association, after which it will come up for disposal by the Association.

It is usual for someone to move that a Committee on Resolutions be appointed. I shall be glad to entertain such a motion from the floor.

DR. BRILL.—I so move.

The motion was seconded and carried.

PRESIDENT CAMPBELL.—I should like to appoint Dr. George H. Stevenson, London, Ontario, Dr. Frank E. Leslie, Northampton, Mass., and Dr. Titus H. Harris, Galveston, Texas, as the Committee on Resolutions.

Since our last meeting, death has taken its toll of members of our Association. I shall ask the members to rise while the Secretary reads the names of the departed members.

The audience stood in tribute to the deceased members as Secretary Sandy read the names, as follows:

Abdu M. Ibrahim, M. D., Northampton, Mass., died Jan. 15, 1936.
Hugh A. McKay, M. D., Toronto, Ont., Canada, died Feb. 14, 1936.
Charles A. Baragar, M. D., Edmonton, Alb., Canada, died Mar. 8, 1936.
George E. Clark, M. D., Providence, R. I., died Mar. 14, 1936.
A. Marois, M. D., Quebec, Canada, died Apr. 9, 1936.
George W. Stephens, M. D., Natchitoches Parish, La., died Apr. 26, 1936.
Henry O. Spalding, M. D., Hingham, Mass., died May 10, 1936.
James Monroe Austen, M. D., Columbia, S. C., died May 24, 1936.
Alberta S. B. Guibord, M. D., Waban, Mass., died May 27, 1936.
Clarence A. Patton, M. D., Philadelphia, Pa., died June 2, 1936.
James L. Tower, M. D., Wassaic, N. Y., died July 10, 1936.
Charles G. Chaddock, M. D., St. Louis, Mo., died July 20, 1936.
Eugene A. Stanley, M. D., Waterbury, Vt., died Aug. 19, 1936.
William H. Mayer, M.D., Pittsburgh, Pa., died Aug. 23, 1936.
John Percy Wade, M. D., Catonsville, Md., died Aug. 27, 1936.
Frankwood E. Williams, M. D., New York, N. Y., died Sept. 24, 1936.
George E. Poor, M. D., Framingham, Mass., died Oct. 29, 1936.
William D. Stewart, M. D., Weston, W. Va., died Nov. 2, 1936.
Henry J. Gahagan, M. D., Aurora, Ill., died Nov. 10, 1936.
William H. Pritchard, M. D., Columbus, Ohio, died Nov. 11, 1936.
Berthold A. Williams, M. D., Cincinnati, Ohio, died Nov. 18, 1936.
Jau Don Ball, M. D., San Francisco, Calif., died Nov. 25, 1936.
Dorian Feigenbaum, M. D., New York, N. Y., died Jan. 2, 1937.
William G. Stearns, M. D., Winnetka, Ill., died Jan. 11, 1937.
Ferd De Forest Streeter, M. D., Rochester, N. Y., died Jan. 20, 1973.
Barbara Curtis, M. D., Buffalo, N. Y., died Jan. 25, 1937.
Edwin E. Evans, M. D., Columbia, Mo., died Feb. 8, 1937.
William A. White, M. D., Washington, D. C., died Mar. 7, 1937.
Harris A. Bolton, M. D., Warm Springs, Mont., died Mar. 17, 1937.
E. A. Farrington, M. D., Haddonfield, N. J., died Apr. 5, 1937.
H. Irving Cozad, M. D., Cuyahoga Falls, Ohio, died Feb. 1, 1937.
Archibald J. Kilgour, M. D., Kingston, Ont., Canada.
Edward H. Kinsman, M. D., Toronto, Canada.

The dates in the last two cases, we do not have.

PRESIDENT CAMPBELL.—Among those whom we have lost recently was one who referred unusual luster on the Association, a distinguished Past President. I shall ask President-Elect Chapman to present the memorial to William A. White.

Dr. Chapman read the memorial to Past President William A. White.

William Alanson White, M. D.

1870–1937.

It is hard to realize that our friend William Alanson White is no longer with us; that his pen has ceased from its toiling; that his great voice is stilled. But what happy memories he has left to us of a glowing personality, of inspiring speech, of stimulating example and of a man who, giving of himself to the utmost in his chosen field of medicine, did more than anyone else to make this association what it is today. His written word will speak for him down through the years to come, but one wishes it were possible to portray clearly in some indelible fashion the greatness of the man, the enduring values of this living personality.

Dr. White was born in Brooklyn, N. Y., on January 24, 1870, the son of Alanson and Harriet Augusta (Hawley) White. He received his preliminary education in the public schools of that city and being as he says "poor," grasped the opportunity to try examinations for a four year scholarship at Cornell. He passed those examinations and at the age of 15 left his home for Ithaca where at 19 he graduated. The men whom he tells us influenced him most during these important formative years were Prof. Burt G. Wilder, with his work on brain morphology; Prof. Simon Henry Gage, in histology and embryology; Prof. Henry S. Williams, in geology and paleontology; Prof. John Henry Comstock, in entomology; and finally Prof. Jacob Gould Schurman of the Department of Philosophy. The influence of these great teachers was profound and had much to do with bringing about his determination to study medicine. He then at 19 entered the Long Island College Hospital Medical College where at 21, in the year 1891, he was given his medical degree. There followed experience as an emergency hospital ambulance surgeon and house surgeon, and on the alms and workhouse medical staff of Blackwell's Island. Finally he returned to the staff of the Long Island College Hospital from which he had graduated and it is significant that there he associated himself under Dr. William Browning with a dispensary receiving nervous diseases. In 1892 there came to him the opportunity to join the medical staff of the Binghamton (N. Y.) State Hospital as an assistant physician. It was here under that able medical superintendent, Dr. Charles G. Wagner, that Dr. White received his training in hospital administration. His 11 years at Binghamton were years of growth. It was during this period that great strides were being made in the introduction of better medical and surgical attention. The training school for nurses in the mental hospital came into being. One would like to pause here to tell some of the stories still told in Binghamton and elsewhere of the White of those times, incidents of the hospital day, of his social proclivities, his love of the theater, his musical interests and the entertainments for patients which he helped put on. For his chief interest then, as afterward, was always in his patients and he sought constantly to know and understand them better. This drive to better understand the language and behavior of patients was vastly stimulated by his visits to the newly established Pathological Institute in New York City where

he met and became friendly with Boris Sidis, then working with hypnosis on problems in "Mental Dissociation."

Speaking in his "Forty Years of Psychiatry" of his experience with Sidis, which seemed to him "crucial," White says, "Almost without knowing it I absorbed the rudiments to what was subsequently to be the doctrine of the unconscious and accepted from the very beginning in my attitude toward these problems the principle of determination in the psychological field."

Another event of first importance which occurred in the summer of 1896 was his meeting with Smith Ely Jelliffe of New York who was spending some months at the hospital in study. From this early association there developed a close friendship, of great benefit to both and to American psychiatry, which endured to the end.

Dr. White had for some time held the position of first assistant physician at the Binghamton State Hospital when the opportunity came for him to seek the office of Medical Superintendent at St. Elizabeth's Hospital in Washington, D. C. He applied for the position and in 1903 was appointed by executive order of Theodore Roosevelt, then President.

There followed several most difficult years of reorganization and completion of extensive building construction which had been interrupted by the death of his predecessor. The St. Elizabeth's which he found was in many respects far behind the times, not only as to construction of old buildings and inadequate hospital facilities but as to the actual care and treatment of patients. He was beset by labor difficulties and by the petty schemes of politicians; there were hangers-on and plotters against him. He was forced to submit to investigation after investigation. He won through, but no man without his infinite patience and rare judgment could have accomplished in those first years what he did in laying the foundations of the St. Elizabeth's of today, a modern psychiatric hospital adapted in construction and organization to meet ever-changing conditions and demands. And as he built his hospital and defined its policies so he himself grew in the esteem and affection of the community and in the respect of Washington officialdom. As to the latter the many occasions on which his advice on government projects and policies was sought bear witness.

He was a great hospital administrator. The welfare of his patients remained always his first consideration and he saw to it that that was the attitude of his staff. He saw each Monday every patient who had been admitted during the week preceding. For many years, until the growth of the hospital and his increasing responsibilities made it impracticable, he conducted the daily clinical staff conferences. He could delegate authority. He selected his man, defined his responsibilities and told him to go ahead and do his job. There was rarely interference.

In the face of mistakes or of hospital catastrophe of one sort or another his reaction was invariably, "How can we capitalize on this? How can the hospital benefit in the future?"

He had a remarkable optimism and an unusual tolerance. He loved his fellow man and he believed in him. If one of his staff proved weak he sought

for such elements of strength as existed and built on that, and again and again his course was justified.

He urged the young physician to write—to put his thoughts on paper—and many a paper found its way into print, less it seemed sometimes on account of the value of its contents than that he felt its publication would be an incentive.

His contact with the various hospital departments remained through the years surprisingly close for one involved in so many time consuming interests. Dr. White gave the impression at times that hospital responsibilities slipped easily from his shoulders. Nothing could have been farther from the truth. His hospital responsibilities were constantly with him, at home or abroad, and when on vacation or ill he was in daily communication and in command of the situation, most frequently through his good friend and faithful secretary for 26 years, Arnold Barbour. St. Elizabeth's was a great part of his life. His genuine enthusiasm over a new dining room or operating room or special clinic equalled apparently his feeling for a new method of treatment or some new scientific venture and was a joy to see.

He was a champion of the large hospital from the point of view both of economy and, when well organized, as affording the best opportunities for clinical and research activity.

St. Elizabeth's grew in his administration from 2300 to nearly 6000 beds.

He was the first to develop within a mental hospital a special department of internal medicine for the benefit of the physically ill and for research purposes. He took justifiable pride in his new laboratory building and in his finely arranged and equipped Medical and Surgical Building completed only three years ago. He was progressive—always in the forefront of medical advance. He was the first in this country to undertake the malarial treatment of general paresis.

Grateful acknowledgment must be made of his fight of more than 30 years to do away with the archaic jury trial for purposes of commitment in the District of Columbia through the passage of a modern commitment law. That his efforts did not succeed may be ascribed to the whims of the inevitable congressman who in every session appeared to block him, usually only with the argument that "they don't do things that way where I come from." When his bill finally does become law it is to be hoped that its authorship is acknowledged.

It would be hard to overestimate the value of the more than 35 years' service of Dr. White to this association. Always interested and active he could be depended upon to answer any demand. On committees and in the Council he showed, in his consideration of the affairs of the association, both wisdom and a rare judgment. In the clinical sessions he was a most highly valued discussant. How many times he rose to his feet to discuss some particularly troublesome, difficult or obscure point, to defend some policy or some clinical or scientific trend of thought from attack I do not know. They were many. And invariably the atmosphere was the clearer when he sat down. Of the many occasions that come to mind one may be referred to—that occasion at the meeting in Baltimore in 1914 when certain

of the older members to whom the word psychoanalysis was anathema made a concerted and bitter attack on this method of approach to the problems of the patient. Dr. White, quite undisturbed, responded, the high effectiveness of his reply being enhanced no less by his simple logic than by his restraint, temperance of speech and obvious good humor.

In his Presidential address delivered at the Richmond, Va., meeting in 1925, Dr. White argued for a union of the various associations then existing whose interests were common with those of The American Psychiatric Association. Those associations, among others mentioned at that time, included the National Association for the Study of Epilepsy and the American Association for the Study of the Feebleminded. He there laid the foundation for our present sectional organization, without loss of essential independence of the various parts but united and the more powerful for the carrying out of our common aims.

He was a prolific writer. We cannot dwell here on this aspect of his activities. Eighteen books came from his pen, two of them, Modern Treatment of Nervous and Mental Disease, and Diseases of the Nervous System, a textbook of Neurology and Psychiatry, in collaboration with his friend Jelliffe. With Dr. Jelliffe also he published the Nervous and Mental Disease Monographs and the Psychoanalytic Review, the latter dating from 1913.

His Outlines of Psychiatry, for more than 30 years the textbook of the medical student, went through 14 revised editions and was published in many foreign languages. There are included in his bibliography well over 200 published works.

With his singular lucidity of thought and expression he was always, to many of us, the great interpreter and integrator. He influenced, I believe, more than anyone else, the incorporation of psychiatry into general medicine. This is evidenced today by our medical school curricula. It would be difficult indeed to estimate how much he did to remove general lightness of view on the part of medical men toward psychiatry.

To the public at large he interpreted with great clarity the principles of mental hygiene. He was one of the earliest of those who recognized and wrote of the contributions which should flow in either direction between psychiatry and the social sciences. More effectively than any other man he sought to integrate psychiatry with law for the benefit of the mentally ill.

Many have wondered how so busy a man could be so productive. With an article to prepare he studied and wrote late at night, he discussed the subject with whomever might be close at hand. He formulated his subject matter in his mind and then he dictated rapidly, pacing up and down the floor, his hands behind him, and rarely did he make a correction. With such a task before him he was most impatient. He felt driven until it was completed. With dictation finished he hung restlessly over his secretary's shoulder asking from time to time as to progress being made until the typing was done.

He was a great speaker; his presence, quality of tone and enunciation, logic, simplicity in verbal selection and gift for analogy made it a delight

to hear him. He was a remarkable extemporaneous speaker. To his formal addresses he gave much thought and preparation.

He was naturally in great demand. He talked before medical societies, scientific associations, legal groups, social workers, nursing associations, lay bodies about the subjects nearest his heart.

He overtaxed his strength again and again. His intimate friend Jelliffe says tersely, "Had he been less conscientiously strenuous and less ready to respond to every call made on him we would have had him with us many more years." That may be true but who in looking back would deny the great constructive value of his message or *deny him* the happiness of having done his duty as on innumerable occasions the opportunity came to him?

At a time when the significance of psychiatry was growing so rapidly, when new roads were opening up on every hand, when the influence of psychiatric thought and effort was spreading with disconcerting speed in so many unforeseen directions, such a man—someone articulate—was needed, and William A. White was there. He brought with him clarity of thought, calm and considered argument, wise counsel.

Dr. White was appointed Professor of Nervous and Mental Diseases at the Medical School of Georgetown University almost immediately after assuming his duties at St. Elizabeth's. In 1904, a year later, he became Professor of Psychiatry at George Washington University. He also lectured each year to members of the Army, Navy and Public Health Medical Corps. In the minds of those who listened to his lectures and case presentations there was never a doubt as to his greatness as a teacher.

The many important positions he held testify to the appreciation and acclaim of his fellows. He was a former President of The American Psychiatric Association; a member of the Board of Directors of the National Committee for Mental Hygiene; former President of the International Committee for Mental Hygiene; and presided at the First International Congress for Mental Hygiene held in Washington in 1930. He was a former president of the American Psychopathological Association; of the Society of Nervous and Mental Diseases of the District of Columbia; a Fellow of the American College of Physicians; a Fellow of the American Medical Association; a member of the American Institute of Criminal Law and Criminology; the American Neurological Association; American Anthropological Association; and many other learned societies and associations.

Dr. White married in March, 1918, Mrs. Lola Thurston, widow of Senator Thurston, of Nebraska, a lady of great charm in whose circle of friends he had been included almost from the time of his coming to Washington. Her influence and help during those early years was important to him and the devoted companionship which ensued greatly enriched his life.

He was a shy man though he concealed it. He was modest, unassuming and given to self-questioning. To one or two who were very close to him he would say sometimes, "I wonder if I am accomplishing anything?" There has rarely been a man who was more sensitive than he to the unhappiness or misfortunes of others. He did not care for vacations. Work

was his greatest pleasure. He did enjoy student gatherings, smokers and those meetings with groups of friends where men relax and put away for the moment everything serious. There his laughter rang out and his happiness was contagious. He had a fine sense of humor and his conversation was wholesomely pungent. He was a good friend and to his friends gave of himself lavishly.

He was to have been the speaker at a dinner to a friend of 30 years' close association. He was not at all well but felt that he must go. He attended but before he was called on to speak he suffered a chill and was taken home. He did not get up again. Six days later the end came.

Finally, may I quote from his presidential address at the First International Congress on Mental Hygiene: "Mental hygiene presents a positive program for life well lived. . . . . The value of life is measured by what we become and so by the nature of the influences we radiate in our living. Life's values are . . . . expressed in terms of character of man as a social being, of those effects he produces on those about him, the enthusiasms he stimulates, that go reverberating down the ages, translated by the personalities that trace back to the original source. . . . . This is a tangible form of immortality toward which everyone may strive with some show of success and, in the striving, get out of life the most there is in it for him."

Quite unconsciously he here spoke of himself, his life's work and its unending influence.

PRESIDENT CAMPBELL.—In accordance with precedent, I shall now ask the President-Elect, Dr. Chapman, to take the chair.

President-Elect Chapman assumed the chair.

CHAIRMAN CHAPMAN.—It is with the greatest of pleasure that I introduce to you our President, Charles Macfie Campbell!

President Campbell read his presidential address, following which the audience arose and applauded.

CHAIRMAN CHAPMAN.—The presidential address is, as you know, not open to discussion, but I am assured that in this instance you will approve of my calling on Dr. Adolf Meyer to express our appreciation of this splendid presentation.

DR. ADOLF MEYER.—*Mr. Chairman, Dr. Campbell and Members and Guests of the Association:* We have listened to a verbal picture of peace and war, of wide ranges of detail and of the opportunity which all of us have in our share in the problem that brings us together, namely, the opportunity of seeing wholes and parts, large ranges and intimate details. It is that, to my mind, which was a fitting picture for what activates us the days of this week. I liked the realization of our program being widely diversified, very detailed, and the need of having in the presidential introductory address a setting for that which is first furnished us, for that which will activate a great deal of our time and of our interest.

Undoubtedly those who brought forth the recommendation for peace, the psychiatrists who activated a large number of psychiatrists to speak for the concept of something apparently too peaceful, where peace is connected with the idea of absolute quiet—those who had that in mind certainly were people of action, were people who had an interest in bringing that which seems not to express all the instincts before the people who, after all, are activating the wide range of life of the world. We can do but very little; but whether we go to the details of chemistry, to the details of physiology, to the details of the nervous system, to the details of behavior, we ultimately have to find the settings. I am delighted to hear particularly the emphasis on the picture of the person who in the institution which gives us a concentration of the many cases has to find that balance which will bring the knowledge of detail into the life of the institution, the life of those about the institution and the life of that which I think has more and more come to constitute our definition of psychiatry.

I thank Dr. Campbell for giving us this setting for the cafeteria.

CHAIRMAN CHAPMAN.—Thank you, Dr. Meyer.

Now, sir, I restore the meeting to your hands.

President Campbell resumed the chair.

PRESIDENT CAMPBELL.—This is the end of this morning's program, so a movement to adjourn is in order.

The meeting adjourned at eleven fifty-five o'clock.

WEDNESDAY MORNING SESSION.

MAY 12, 1937.

The meeting convened at nine-forty o'clock, President Campbell presiding.

PRESIDENT CAMPBELL.—The meeting will please come to order.

The first piece of business this morning is the report of the Council. Dr. Sandy!

SECRETARY SANDY.—The Council met in the William Penn Hotel, Tuesday, May 11, 1937, at 5.15 p. m. Dr. Campbell, the President, presided. There were 16 members present.

Invitations for the 1938 meeting were further considered from Detroit, Mich.; Cincinnati, and Columbus, Ohio; Chicago, Ill.; and again from San Francisco, Calif.; members of the association representing these several cities presenting their invitations in person. A secret ballot indicated a majority of the members favored San Francisco, Calif.

Upon motion of Dr. Grill, seconded by Dr. Williams, the Council then voted unanimously to hold the 1938 meeting in San Francisco, Calif., the time to be fixed by the Executive Committee after conferring with the local Committee on Arrangements.

The Council discussed the report of the Committee on Public Education, suggesting to the Chairman, Dr. Burlingame, that further consideration be given it for reference again to a subsequent meeting of the Council.

In the absence of the Chairman, Dr. Strecker, the Secretary read the revised report of the Committee on Psychiatry in Medical Education. Upon motion of Dr. Cheney, seconded by Dr. Williams, the Council voted to accept the report for printing in the proceedings with the deletion of the third paragraph.

Upon motion of Dr. Hamilton, seconded by Dr. Jackson, the Council voted approval of the following resolution:

"In case a Fellow or Member has been dropped for non-payment of dues and asks for reinstatement, he shall be required to submit evidence that all arrears to the Association have been paid. If the Board of Examiners shall recommend his reinstatement, a former Fellow may elect to pay also the dues paid by Fellows during the intrevening years in order that he may hold his eligibility for life membership."

The Council adjourned at 6.35 p. m.

PRESIDENT CAMPBELL.—What is your wish with regard to this report of the Council?

DR. HARRY STACK SULLIVAN.—I move the report be received and approved.

The motion was seconded and carried.

PRESIDENT CAMPBELL.—The report of the Auditors will be postponed until a subsequent meeting.

I call upon the Chairman of the Nominating Committee for the report of the Nominating Committee. Dr. Cheney!

DR. CHENEY.—Mr. President, in accordance with the ballot that has been forwarded to all members of the Association, the Nominating Committee proposes for election the following Fellows of the Association:

For President for the year 1937-38, Dr. Ross McC. Chapman, Towson, Md.

For President-Elect, Dr. Richard H. Hutchings, Utica, N. Y.

For Secretary-Treasurer, Dr. William C. Sandy, Harrisburg, Pa.

For Councillors for three years:

Dr. Charles Macfie Campbell, Boston, Mass.
Dr. Charles H. Dolloff, Concord, N. H.
Dr. George S. Johnson, San Francisco, Calif.
Dr. Harry C. Solomon, Boston, Mass.

For Auditor for three years, Dr. Robert B. Winterode, Crownsville, Md.

PRESIDENT CAMPBELL.—Nominations from the floor are in order. If there are no nominations from the floor, what is your wish with regard to this report of the Nominating Committee?

DR. HARRY STACK SULLIVAN.—I move the Secretary be instructed to cast one ballot for the election of the nominees for the positions stated.

The motion was seconded and carried.

PRESIDENT CAMPBELL.—Mr. Secretary!

SECRETARY SANDY.—I hereby cast the ballot.

PRESIDENT CAMPBELL.—The Secretary has cast the ballot, and the officers for the coming year are:

President, Dr. Ross McC. Chapman, Towson, Md.
President-Elect, Dr. Richard H. Hutchings, Utica, N. Y.
Secretary-Treasurer, Dr. William C. Sandy, Harrisburg, Pa.
Councillors for three years
Dr. Charles Macfie Campbell, Boston, Mass.
Dr. Charles H. Dolloff, Concord, N. H.
Dr. George S. Johnson, San Francisco, Calif.
Dr. Harry C. Solomon, Boston, Mass.
Auditor for three years, Dr. Robert P. Winterode, Crownsville, Md.
Is there any unfinished business, Mr. Secretary?

DR. SECRETARY.—There is none.

PRESIDENT CAMPBELL.—Is there an new business?

The meeting adjourned at ten forty-five o'clock.

THURSDAY MORNING SESSION.

MAY 13, 1937.

The meeting convened at nine-forty o'clock, President Campbell presiding.

PRESIDENT CAMPBELL.—The meeting will please come to order.

The first piece of business is the presentation of the Auditor's report. Dr. Buckley!

DR. BUCKLEY.—*To the Members of The American Psychiatric Association:* On behalf of the Auditors, I would respectfully present the following statement concerning the accounts and receipts and expenditures of The American Psychiatric Association for the period from April 16, 1936, to April 15, 1937, also the statement of the cash receipts and disbursements for the AMERICAN JOURNAL OF PSYCHIATRY for the period of April 16, 1936, to April 15, 1937, which accounts have been examined by Turoff & Goldstock, Certified Public Accountants, we have checked the vouchers and balances and find them correct.

ALBERT C. BUCKLEY,
MAX A. BAHR,
JULIAN W. ASHBY.

PRESIDENT CAMPBELL.—What is your wish with regard to this Auditors' report? Does anyone move its acceptance?

DR. BRILL.—I so move.

The motion was seconded and carried.

PRESIDENT CAMPBELL.—The next piece of business is with regard to the election of members. You have each before you a list of members which has been carefully gone over by the Board of Examiners who referred the names on this list to the Council, who again went over this list and who recommend these candidates for the various forms of membership which you will see on the mimeographed list.

There are 31 candidates recommended for Associate membership, 159 for Membership. There are 12 recommended for transfer from Associate Membership to Membership, and there are 11 recommended for transfer from Membership to Fellowship. What is your wish with regard to these names?

DR. CORIAT.—I move the Secretary cast one vote for the entire list.

The motion was seconded and carried.

PRESIDENT CAMPBELL.—Mr. Secretary, will you please cast the ballot?

The Secretary cast the ballot.

PRESIDENT CAMPBELL.—The Secretary having cast his ballot, these members are duly elected.

MEMBERS ELECTED MAY 13, 1937.

ASSOCIATE MEMBERS.

Baganz, Crawford Norbert, M. D., Lyons, N. Y.
Birnbaum, Leo, M. D., Sheridan, Wyoming.
Bondar, H. Kelliher, M. D., New York City, N. Y.
Brody, Morris Wolf, M. D., Sykesville, Md.
Cameron, Norman, M. D., Baltimore, Md.
Caprio, Frank Samuel, M. D., Marion, Ind.
Carlson, Carroll Cypher, M. D., Topeka, Kans.
Carroll, Jr., Edward J., M. D., Pittsburgh, Pa.
Clements, Ralph Mayo, M. D., Tuscaloosa, Ala.
Duffey, Raymond John, M. D., Boston, Mass.
Eagleton, John Theo Thomas, M. D., Danville, Ill.
Hardgrove, Thomas J., M. D., Palo Alto, Calif.
Henninger, James Murdoch, M. D., Woodville, Pa.
Hyde, Marshall E.,M. D., Osawatomie, Kans.
Kelly, William H., M. D., Pontiac, Mich.
Kramer, Frederick Herman, M. D., Norristown, Pa.
Matthaei, Pearl Viola, M. D., Jamestown, N. D.
Morgan, John D'Arcy, M. D., Knoxville, Iowa.

Phillips, Stonewall Jackson, M. D., Pineville, La.
Reider, Norman, M. D., Topeka, Kans.
Rosen, Michael, M. D., Marion, Ind.
Rosenberg, Seymour J., M. D., Camp Custer, Mich.
Srodes, William Glenn, M. D., Woodville, Pa.
Stewart, Genevieve Margaret, M. D., Washington, D. C.
Sullivan, Daniel Joseph, M. D., Bedford, Mass.
Tomlinson, Paul Jay, M. D., Helmuth, N. Y.
Tompkins, Harvey John, M. D., Mendota, Wis.
Trevett, Laurence Davies, M. D., Stockbridge, Mass.
Wadsworth, Morton Lyon, M. D., White Plains, N. Y.
Warson, Samuel Russel, M. D., New Haven, Conn.
Watson, James, M. D., Elgin, Ill.

MEMBERS.

Adams, Winthrop, M. D., Bedford, Mass.
Anderson, Camilla M., M. D., Pittsburgh, Pa.
Bache, Irma, M. D., Boston, Mass.
Baker, Samuel R., M. D., Northport, L. I., N. Y.
Bamford, Jr., Thomas Edwin, M. D., New York City, N. Y.
Barron, Archibald Alexander, M. D., Charlotte, N. C.
Barrows, Charles Voile, M. D., Hines, Ill.
Beck, Eva Fowler, M. D., Eloise, Mich.
Beck, Richmond James, M. D., Northport, L. I., N. Y.
Bergman, Murray, M. D., Middletown, N. Y.
Berman, William, Yonkers, N. Y.
Blackwelder, Robert Guy, M. D., Huntington, W. Va.
Boshes, Benjamin, M. D., Chicago, Ill.
Gowen, Ulysses S., M. D., Palo Alto, Calif.
Braceland, Francis J., M. D., Philadelphia, Pa.
Brake, Charles Arthur, M. D., Norman, Okla.
Brawner, Albert Ferguson, M. D., Smyrna, Ga. (Reinstated)
Bridgman, Olga Louise, M. D., San Francisco, Calif.
Broder, Samuel B., M. D., Chicago, Ill.
Brown, Felix Manning, M. D., Boston, Mass.
Butler, Samuel A., M. D., Pontiac, Mich.
Carson, Robert James, M. D., Norwich, Conn.
Casey, Jesse Frank, M. D., Lexington, Ky.
Clarke, Albert S. J., M. D., Little Rock, Ark.
Clifton, Edward Graham, M. D., New York, N. Y.
Closson, James Harwood, M. D., Philadelphia, Pa.
Clow, Hollis Emerton, M. D., White Plains, N. Y.
Cohen, Benjamin, M. D., North Grafton, Mass.
Compton, Marion Lee, M. D., Washington, D. C.
Costello, Russell Thomas, M. D., Detroit, Mich.

Cudmore, William Everard, M. D., Buffalo, N. Y.
Cummins, James Anthony, M. D., Toronto, Ont., Canada.
Cunningham, James Morrow, M. D., Hartford, Conn.
Curtis, Howard Crosby, M. D., Wichita, Kans.
Davis, Harvey Franklin, M. D., Tuskegee, Ala.
Day, Giles Warren, M. D., Galveston, Tex.
Donley, Dorothy Evelyn, M. D., Cincinnati, Ohio.
Dumas, Alexander G., M. D., Minneapolis, Minn.
Dunlap, Claude M., M. D., N. Chicago, Ill.
Elliott, B. Landis, M. D., Kansas City, Mo.
Erps, Benjamin, M. D., Milwaukee, Wis.
Evans, David Sproul, M. D., Willard, N. Y.
Falstein, Eugene I., Elgin, Ill.
Fentress, Thomas Lyon, M. D., Chicago, Ill.
Fetterman, Joseph L., Cleveland, Ohio.
Finesinger, Jacob Ellis, M. D., Boston, Mass.
Finkelman, Isidore, M. D., Chicago, Ill.
Flower, Bardwell Hastings, M. D., N. Grafton, Mass.
Freeman, William K., M. D., Gulfport, Miss.
Fuerst, Rudolf A., M. D., Chicago, Ill.
Gardiner, Harry M., Westboro, Mass.
Ginsburg, May Ethel, M. D., New York, N. Y.
Gliebe, Paul Anthony, M. D., San Francisco, Calif.
Goldstein, Richard, M. D., New Haven, Conn.
Gomory, Samuel Charles, M. D., Pittsburgh, Pa.
Goodwin, Orren P., M. D., Fayetteville, Ark.
Gottlieb, Jacques Simon, M. D., Iowa City, Iowa.
Gould, James A., M. D., Dayton, Ohio.
Gray, Lloyd P., M. D., White Plains, N. Y.
Green, John W., M. D., N. Chicago, Ill.
Greenfield, Michael Breinar, M. D., Palo Alto, Calif.
Grinker, Roy Richard, M. D., Chicago, Ill.
Haines, William Henry, M. D., Chicago, Ill.
Ham, Clem, M. D., Goldsboro, N. C.
Hanks, Ralf, M. D., Fulton, Mo.
Hansen, Hans, M. D., Canandaigua, N. Y.
Hanson, Harold B., M. D., Chicago, Ill.
Hayward, Emeline Place, M. D., New York, N. Y.
Hudgens, John C., M. D., Gulfport, Miss.
Humphreys, Edward Jackson, M. D., Letchworth Village, Thiells, N. Y.
Hunt, Robert Cushman, M. D., Rochester, N. Y.
Huschka, Mabel, M. D., New York, N. Y.
Jamison, Jr., Daniel Irwin, M. D., Mayview, Pa.
Johnson, Mary, M. D., N. Grafton, Mass.
Johnson, William Joseph, M. D., Coatesville, Pa.
Jolley, William A., M. D., N. Little Rock, Ark.

Kaplan, Julius Arthur, M. D., Danville, Ill.
Katz, Gabriel Henry, M. D., Philadelphia, Pa.
Keller, Billy Karl, M. D., White Plains, N. Y.
Kelling, Jordan Albert, M. D., St. Louis, Mo.
Kimbell, Isham, M. D., Lexington, Ky.
Klepfer, Jefferson Franklin, M. D., Milwaukee, Wis.
Kusch, Ernest, M. D., Wards Island, New York, N. Y.
Lapp, Titus Samuel, M. D., Fulton, Mo.
La Vallee, Joseph Charles Edward, M. D., Buffalo, N. Y.
Leach, David, M. D., Detroit, Mich.
Liberman, David L., M. D., Camp Custer, Mich.
Lion, Ernest George, M. D., New Haven, Conn.
Little, Harry Morrow, M. D., Pittsburgh, Pa.
Lloyd, Henry W., M. D., New York, N. Y.
Lloyd, John Gilbert, M. D., Pittsburgh, Pa.
Low, Abraham A., M. D., Chicago, Ill.
Ludwig, Irving I., M. D., N. Chicago, Ill.
McAuslan, James Lewis, M. D., N. Grafton, Mass.
McGavin, Agnes Purcell, M. D., Buffalo, N. Y.
Manney, Willis E., M. D., Outwood, Ky.
Masserman, Jules H., M. D., Chicago, Ill.
Michael, Nicholas, M. D., Columbus, Ohio.
Mollo, Louis D., M. D., Coatesville, Pa.
Morgan, Howard P., M. D., St. Cloud, Minn.
Myers, Asa Lee, M. D., N. Chicago, Ill.
Nunberg, Herman, M. D., New York, N. Y.
Offner, John Edward, M. D., Weston, W. Va.
Orloff, Mollie Esther, M. D., Norristown, Pa.
Osgood, Winthrop Bancroft, M. D., Mattapan, Mass.
Ossenfort, William F., M. D., Lexington, Ky.
Owens, Tracy C., M. D., Knoxville, Iowa.
Peatick, George E., M. D., Westboro, Mass.
Pitts, Charles Nathaniel, M. D., Tuskegee, Ala.
Poellot, Cleophas Earl, M. D., Woodville, Pa.
Powdermaker, Florence, M. D., New York, N. Y.
Reinke, Charles Knause, M. D., Norristown, Pa.
Rioch, Janet McKenzie, M. D., New York, N. Y.
Rooks, Wendell Hofman, M. D., Pontiac, Mich.
Rosenbloom, Julius H., M. D., Pueblo, Colo.
Rossman, I. Murray, M. D., Wingdale, N. Y.
Rowland, Robert Elmore, M. D., Little Rock, Ark.
Ruslander, David, M. D., Buffalo, N. Y.
Salisbury, Frederick Scott, M. D., Knoxville, Iowa.
Sassin, Edmond Francis, M. D., St. Louis, Mo.
Schantz, Benjamin Arthur, Middletown, N. Y.
Sheets, Rector Philip, M. D., Traverse City, Mich.

Shelton, Samuel Wayne, M. D., Evanston, Wyo.
Shield, James Asa, M. D., Richmond, Va.
Shlionsky, Herman, M. D., Cedar Grove, N. J.
Silverburg, Shelton G., M. D., Marion, Ind.
Sim, William A., M. D., Sheridan, Wyo.
Singleton, Dennis Edward, M. D., Leavenworth, Kans.
Skobba, Joseph Stanley, M. D., Indianapolis, Ind.
Fremont-Smith, Frank, M. D., New York, N. Y.
Smith, Harold Wilbur, M. D., N. Grafton, Mass.
Smith, Ned Rudolph, M. D., Tulsa, Okla.
Stathakis, John, M. D., Little Rock, Ark.
Stewart, Augustus Burns, M. D., Albuquerque, N. M.
Suraci, Francis X., M. D., Gulfport, Miss.
Szurek, Stanislaus Andrew, M. D., Chicago, Ill.
Taylor, Charles Vivian, M. D., Sykesville, Md.
Thomson, Mary Marjory, M. D., New York, N. Y.
Thompson, Burton Austin, M. D., Fort Lyon, Colo.
Timme, Arthur R., M. D., Los Angeles, Calif.
Tornay, Anthony Stephen, M. D., Philadelphia, Pa.
Trapp, Carl Edward, M. D., Boston, Mass.
Turner, Carroll Conway, M. D., Memphis, Tenn.
Unger, Max, M. D., Middletown, N. Y.
Usow, John Maurice, M. D., Washington, D. C.
Valentine, Edna S., M. D., Columbia, S. C.
Van Ophuijsen, Johan Hendrik Wijnand, M. D., New York, N. Y.
Waggoner, Raymond Walter, M. D., Ann Arbor, Mich.
Waraich, Gurbakhash Singh, M. D., Topeka, Kans.
Weber, Frederick Henry, M. D., Worthington, Ohio.
Weber, Mary Jackson, M. D., Worthington, Ohio.
White, Paul L., M. D., Dallas, Tex.
Whitehead, Leston Snell, M. D., Detroit, Mich.
Wilcox, Paul Harlan, M. D., East Gardner, Mass.
Williams, Donald B., M. D., Knoxville, Iowa.
Wilson, Joseph G., M. D., Ellis Island, N. Y.
Wyers, Robert Edwin, M. D., Spadra, Calif.
Zeritsky, Samuel A., M. D., Byberry, Philadelphia, Pa.
Zuger, Max, M. D., Middletown, N. Y.

TRANSFER FROM ASSOCIATE MEMBER TO MEMBER.

Briehl, Walter, M. D., New York, N. Y.
Campbell, Coyne Herbert, M. D., Chicago, Ill.
Herskovitz, Herbert H., M. D., Wernersville, Pa.
Kleiman, Charles, M. D., Marcy, N. Y.
Knight, Robert Palmer, M. D., Topeka, Kans.
Leonard, Noble Day, M. D., N. Chicago, Ill.
Lindenfeld, Arthur, M. D., Allentown, Pa.

Moorad, Philip J., M. D., New Britain, Conn.
Sommer, Conrad Samuel, M. D., Chicago, Ill.
Tidd, Charles Wharton, M. D., Topeka, Kans.
Weight, Jesse J., M. D., Provo, Utah.
Weiss, Isidore Irwin, M. D., Los Angeles, Calif.

TRANSFER FROM MEMBERS TO FELLOWS.

Angus, Leslie R., M. D., Hartford, Conn.
Ashby, Julian Warrington, M. D., Raleigh, N. C.
Bell, Peter, M. D., Madison, Wis.
Cameron, Donald Ewen, M. D., Worcester, Mass.
Curran, Frank Joseph, M. D., New York, N. Y.
Deming, Julia, M. D., Vienna, Austria.
Dunbar, Flanders, M. D., New York, N. Y.
Erickson, Milton Hyland, M. D., Eloise, Mich.
Harding, George Tryon, M. D., Columbus, Ohio.
Wolfe, Theodore P., M. D., New York, N. Y.
Wortis, Samuel Bernard, M. D., New York, N. Y.

PRESIDENT CAMPBELL.—Have you any further business, Mr. Secretary? Is there any business to be brought up from the floor?

The meeting adjourned at nine forty-five o'clock.

FRIDAY MORNING SESSION.

MAY 14, 1937.

The meeting convened at nine-forty o'clock, President Campbell, presiding.

PRESIDENT CAMPBELL.—The Association will please come to order. The first piece of business is the report of the Council by the Secretary.

SECRETARY SANDY.—The Council met in the William Penn Hotel at 5.10 p. m., Thursday, May 13, 1937, Dr. Campbell, the President, presiding. There were 12 members in attendance.

The Council voted to accept the revised report of the Committee on Public Education for printing in the proceedings.

The revised report of the Committee on Psychiatric Social Work was also accepted subject to such possible minor changes as may be deemed necessary by the President.

The Secretary read a communication from the Royal Medico-Psychological Association, transmitted to the President by the Secretary of the British Embassy, inviting the appointment of delegates of The American Psychiatric Association to the annual meeting to be held at Ayr, Scotland, from July 7 to July 8, 1937. The Council authorized the President to designate as delegates members who may find it possible to attend the meeting of the British Medico-Psychological Association.

The Council nominated to the American Board of Psychiatry and Neurology:

Dr. Adolf Meyer.
Dr. C. Macfie Campbell.
Dr. Franklin G. Ebaugh.
Dr. Edward A. Strecker.

The Council tendered Dr. Cheney a vote of thanks for his services in connection with the organization and continued activities of the American Board of Psychiatry and Neurology.

Upon motion of Dr. Chapman, seconded by Dr. Cheney, the Council approved the appointment of Dr. William E. Gardner, of Louisville, Ky., to the Board of Examiners to succeed Dr. Campbell, whose term has expired.

The Council voted the nomination of Dr. John C. Whitehorn, of Waverly, Mass., to represent the Association on the National Research Council to succeed Dr. Farr, whose term has expired.

The Council elected the Executive Committee to consist of the officers:

Dr. Ross McC. Chapman, President.
Dr. Richard H. Hutchings, President-Elect.
Dr. William C. Sandy, Secretary-Treasurer.

and two other members:

Dr. J. Allen Jackson.
Dr. Walter L. Treadway.

The Council passed a resolution of thanks to President Campbell for the inspiration of his leadership and his effective conduct of the affairs of the Association during the past year.

The Council adjourned at 6.15 p. m.

PRESIDENT CAMPBELL.—What is your wish with regard to this report? Are there any topics that come up for discussion or any questions to be asked?

DR. BRILL.—I move you, sir, the report be adopted as read.

The motion was seconded and carried.

The meeting adjourned at nine forty-five o'clock.

FRIDAY AFTERNOON SESSION.

MAY 14, 1937.

The meeting convened at twelve forty-five o'clock, President Campbell presiding.

PRESIDENT CAMPBELL.—I should like to call on the Chairman of the Committee on Resolutions to present the resolutions. Dr. Stevenson!

Dr. George H. Stevenson read the report of the Resolutions Committee.

PRESIDENT CAMPBELL.—The report of the Committee on Resolutions is accepted with acclamation.

I shall now call upon Dr. Brill to introduce the incoming President.

DR. A. A. BRILL.—*Mr. President, Ladies and Gentlemen:* As I sat here in the beginning of the meeting and listened to Dr. Ross McClure Chapman giving his eulogizing address on the death of his former collaborator and friend, Dr. William Allanson White, I said to myself, "What an admirable and befitting tribute Dr. Chapman gave to an aristocrat of our organization."

Whatever the word "aristocrat" connotes, we understand it as someone who has maintained himself for a long time in a group and not only lived up to the ideals of that group, but progressively carried on the standards of the organization.

As I ruminated in this way, it occurred to me that a great many of the virtues that Dr. Chapman used in the characterization of Dr. White were embodied in himself. It was not, naturally, strange to feel that way, because Dr. Chapman and Dr. White were intimate friends, whereas originally they were in the relationship of teacher and pupil and the pupil became a friend, which means that there was a definite acceptance of an original father and an identification with him.

Dr. Chapman went through a steady and progressive activity in psychiatry. He started in 1906 in the Utica State Hospital. It is remarkable that the Utica State Hospital which is the oldest state hospital in New York, is giving us the incoming President, the President-Elect, Dr. Hutchings, who has been superintendent of it for about 15 years, and an ex-President, another active organizer and standard-bearer of this organization, Dr. Cheney.

Dr. Chapman spent 10 years in his own state, in the State of New York, when he was called as first assistant physician to St. Elizabeth's by Dr. White. To obtain a position of this kind, Dr. Chapman had to show a definite character as a scientist and an organizer.

From Washington, Dr. Chapman then was chosen to take the superintendency of the Sheppard and Enoch Pratt Hospital where he has been functioning since as a steady and sympathetic encourager of science in every effort to help mental and emotional disturbances.

I cannot fail to mention here that Dr. Chapman, like a great many others here, was so sympathetic when I first brought psychoanalysis before this organization, which at that time met with so much resistance. Dr. Chapman has continued for 31 years as a psychiatrist of note. He has done excellent work in his own state. He has worked for the nation, made a splendid record in his work and is a well-known teacher. If we are to judge the future by the past, which we psychiatrists usually do, I feel it augurs well for this organization to have as our incoming President Dr. Ross McClure Chapman, and I take great pleasure in introducing him to you.

PRESIDENT CAMPBELL.—Might I ask Dr. Overholser and Dr. Haskell to act as a guard of honor and escort the President to the platform, according to the traditions of this Association?

Drs. Overholser and Haskell escorted the newly elected President, Dr. Chapman, to the platform.

PRESIDENT CAMPBELL.—Mr. President, it is my very pleasant duty to present to you the insignia of office. I regret that the insignia has a somewhat somber appearance, but you will have to look upon it as conveying to you not merely a badge of office but conveying to you the respect and affection of your colleagues. I am sure that you will find the members of this Association at your service and foremost among those who will be at your service is myself who have been your friend and colleague for over 30 years.

President Chapman took the chair.

PRESIDENT CHAPMAN.—First, I must thank my good friend, my ancient friend, Dr. Brill, not for his too fulsome praise, but for the masterly manner in which he handled a very, very difficult situation.

As I stand here, you see, I feel very strange indeed. I feel a great deal of loss and a good deal as if I were in a dream. I think I feel perhaps more humble than anything else. I have no illusions as to my capacities. There are a great many men who would make a better President in this Association. Here centers something of the fortuitous. Here chance enters as it does in medical associations at times. The lightning strikes here and it strikes there and sometimes it strikes in the most surprising places.

I do not wish to make any lengthy speech. I want to assure the Association of my profound appreciation, of my gratitude for the honor that has been conferred upon me. I want to pledge to the Association my most earnest efforts for the year to come.

Next year the meeting is in California. We go to new fields. Within an hour or so after the meeting place had been chosen, the Program Committee was at work thinking of the special problems that possibly might arise in a meeting at that distance. It is their wish, I know, and it is the wish of all of us, that the California meeting be a success, and if it can be made half as successful as this splendid meeting presided over by Dr. Campbell which is coming to a close has been, we should all be very happy indeed.

So I ask your help, I ask your participation and cooperation because without that the administration of this year on which we are entering cannot be successful. I am sure that I will have such cooperation.

The pleasantest duty that I have or that I will have during the coming year falls to me to perform at the present moment. That is to bestow on the outgoing President the medal or badge of the Association which is known as the badge of the Past President. The Past President—I think that is a dreadful name. I suppose that Dr. Campbell feels that now the burden has rolled from his shoulders, that he can go back to Boston and renew the teaching of the young and play golf and enjoy his tea and a nap perhaps after lunch, that there is no more, that his work for this Association has ended. That, very fortunately, is not the case. If you will look about you and see Dr. Cheney sitting here, Dr. Russell back of him, Earl Bond and one or two others here

who have been Past Presidents, you will realize, Dr. Campbell, that this is only your introduction to hard work. Do not deceive yourself. This badge is a deceiving thing which merely means that you are about to enter into the new types of service and in a sense the Association from now on will work itself well knowing that you are quite helpless and must be so.

It gives me a great deal of pleasure to have the opportunity of bestowing this badge on you. With it there goes the affectionate esteem of the entire Association, the gratitude of the entire Association, and particularly of the officers, Councillors, committeemen and so forth, who have worked with you during the past year. The splendid program is your work; the success of this splendid meeting is yours.

It gives me great pleasure, sir, to extend this to you.

DR. CAMPBELL.—I wish to express my thanks to the Association for this badge which entitles me to inclusion among the club of the passé, and I wish to take this opportunity of thanking the Association individually and collectively for their constant help during the past year. I wish to thank the officers of the Association and Dr. Chapman. I especially wish to thank the Secretary-Treasurer who was the guide of my infant footsteps and who kept me in the straight and narrow path, psychiatrically speaking, during the past year.

Thank you very much!

PRESIDENT CHAPMAN.—Mr. Secretary, is there anything further?

SECRETARY SANDY.—Nothing further.

PRESIDENT CHAPMAN.—I, therefore, then declare the ninety-third meeting of The American Psychiatric Association closed.

The meeting adjourned at one o'clock.

WILLIAM C. SANDY, M. D., *Secretary-Treasurer.*

PROCEEDINGS SCIENTIFIC SESSION

OF THE

NINETY-THIRD ANNUAL MEETING

OF THE

AMERICAN PSYCHIATRIC ASSOCIATION

MAY 10-14, 1937, PITTSBURGH, PA.

JOINT SESSION SECTION ON CONVULSIVE DISORDERS AND AMERICAN CHAPTER OF INTERNATIONAL LEAGUE AGAINST EPILEPSY.

MONDAY MORNING, MAY 10, 1937.

Dr. Stanley Cobb presiding.

Introductory Remarks by Chairman Cobb.

Interpretation of the Electrical Activity of the Brain, by Dr. Hallowell Davis.

Epilepsy: A Paroxysmal Cerebral Dysrhythmia, by Drs. F. A. Gibbs, E. L. Gibbs and W. G. Lennox. Discussion by Dr. Max Levin.

Electrical Signs of Cortical Function in Epilepsy and Allied Disorders, by Drs. Herbert H. Jasper and Ira C. Nichols. Discussion by Dr. William G. Lennox.

The Histopathology of Convulsive Disorders in Children, by Dr. H. M. Zimmerman. Discussion by Drs. Charles Davison, Herbert H. Jasper, Charles P. Fitzpatrick, Adolf Meyer, Stanley Cobb and H. M. Zimmerman.

Motion Picture shown b Dr. Dan S. Renner. Discussion by Dr. William W. Graves.

MONDAY AFTERNOON, MAY 10, 1937.

Dr. Cobb presiding at first, later Dr. W. G. Lennox.

The Cost of Institutional Care of Epileptics in Massachusetts, by Drs. Douglass V. Brown and Merrill Moore. Discussion by Drs. Theodore Diller, Morgan B. Hodskins, Neil A. Dayton, Dan S. Renner, William G. Lennox and Douglass V. Brown (closing).

The Use of Intravenous Methylene Blue in Status Convulsivus, by Drs. Laslo Kajdi and Charles V. Taylor. Discussion by Drs. Stanley Cobb, Theodora Wheeler, Laslo Kajdi, Hugo Mella and Laslo Kajdi (closing).

A Study of the Mentality of Dispensary Epileptic Patients, by Drs. Margaret R. Barnes and Joseph L. Fetterman. Discussion by Drs. Robert L. Dixon, William G. Lennox and J. L. Fetterman (closing).

Some Clinical Neurological Findings in Epilepsy, by Drs. Samuel W. Weingrow, Thomas S. P. Fitch and Albert W. Pigott. Discussion by Drs. Erwin Wexberg and Theodora Wheeler.

Results of Fifteen Years' Experience with the Ketogenic Diet in the Treatment of Epilepsy in Children, by Drs. Henry F. Helmholz and Moe Goldstein. Discussion by Drs. Stanley Cobb, J. L. Fetterman, Morgan B. Hodskins, William W. Graves, William G. Lennox and Henry F. Helmholz.

Report of Nominating Committee.

MONDAY EVENING, MAY 10, 1937.

Dr. G. Kirby Collier presiding.

Remarks on History of the National Association for the Study of Epilepsy, the international League, etc.

The Campaign Against Epilepsy, by Dr. William G. Lennox. Discussion by Drs. Adolf Meyer, Morgan B. Hodskins, Stanley Cobb, William G. Lennox, Robert L. Dixon and Solomon Katzenelbogen.

SECTION ON FORENSIC PSYCHIATRY, MONDAY MORNING, MAY 10, 1937.

Dr. V. G. Branham presiding.

Phylobiological Aspects of Forensic Psychiatry, by Dr. Hans Syz.

Cultural Factors in Crime, by Dr. Franz Alexander. Discussion by Dr. Gregory Zilboorg.

Psychological Interrelationship Between Suicides and Homicides, by Dr. Gregory Zilboorg.

Results and Conclusions Concerning the Warwick School Management of Young Male Delinquents, by Dr. Frederick Tilney. Discussion by Drs. Clarence Oberndorf, A. A. Brill, Bernard Glueck, Charles F. Menninger, Erwin Wexberg and J. L. McCartney.

MONDAY AFTERNOON, MAY 10, 1937.

Dr. V. G. Branham presiding.

The Community's Responsibility Toward Crime, by Judge Paul N. Schaffer. Discussion by Dr. Winfred Overholser.

Borderline Mental States in Crime, by Dr. David B. Rotman.

A psychiatric Study of Recidivists, by Dr. Charles B. Thompson.

A Psychologic Study of the Swindler, by Dr. Walter Bromberg. Discussion by Drs. Karl M. Bowman and Franz Alexander.

Modus Operandi and Psychopathology of Homicides and Sex Offenders, by Dr. John A. Larson.

SECTION I. TUESDAY AFTERNOON, MAY 11, 1937.

President Campbell presiding.

Primary Affect Hunger, by Dr. David Levy.

Child Analysis as a Technique in the Investigation of Mental Mechanisms, by Dr. Margaret W. Gerard.

Child Psychiatry, by Dr. James S. Plant.

Some Therapeutic Principles Applicable to Psychiatric Work with Children, by Dr. Frederick H. Allen.

An Evaluation of the Treatment of Problem Children as Determined by a Follow-Up Study, by Drs. Howard W. Potter and Henriette R. Klein.

Problem Children Growing Up, by Dr. Leo Kanner. Discussion by Drs. James K. Everhart, Adolf Meyer, Erwin Wexberg, James L. McCartney, David M. Levy (closing), Margaret W. Gerard (closing), Frederick H. Allen (closing) and Leo Kanner (closing).

JOINT SESSION WITH SECTION ON PSYCHOANALYSIS AND THE AMERICAN PSYCHOANALYTIC ASSOCIATION. WEDNESDAY MORNING, MAY 12, 1937.

President Campbell at first presiding, later Dr. Hutchings acting as chairman.

Psychoanalytic Contributions in Private Psychiatric Practice, by Dr. George W. Smiltz.

The Psychoanalytic Clarification of Personality Types, by Dr. Ernest E. Hadley.

Psychoanalytic Contributions to the Conception of Disorder Types, by Dr. N. Lionel Blitzsten. Discussion by Drs. A. A. Brill, Nolan D. C. Lewis, Harry Stack Sullivan, Gregory Zilboorg, M. Ralph Kaufman, Clarence P. Oberndorf, Henry M. Hart, A. A. Brill and Jacob Kasanin.

WEDNESDAY AFTERNOON, MAY 12, 1937.

Dr. C. F. Williams at first presiding, later Dr. Earl D. Bond.

Prognosis in Mental Disease, by Drs. Earl D. Bond and Francis J. Braceland. Discussion by Drs. William W. Graves, Ross Dodson, Bernard Glueck and Francis J. Braceland.

The Irganic Background of Obsessions and Compulsions, by Dr. Paul Schilder. Discussion by Drs. Harold F. Corson, Erwin Wexberg and Paul Schilder (closing).

Bio-Physical Factors in Relation to Functional Imbalance, by Dr. Trigant Burrow. Discussion by Drs. Helen P. Langner and Trigant Burrow (closing).

Parotid Gland Secretions in Manic-Depressive Patients, by Drs. Edward I. Strongin and Leland E. Hinsie. Discussion by Drs. Roy D. Halloran, P. G. Hamlin, Eugene S. Falstein and Edward I. Strongin (closing).

Relations Between Precipitating Situations and Outcome in Manic-Depressive Psychosis, by Dr. Robert C. Hunt. Discussion by Drs. Grace Baker and Robert C. Hunt (closing).

JOINT SESSION WITH AMERICAN PSYCHOLOGICAL ASSOCIATION,
THURSDAY MORNING, MAY 13, 1937.

Dr. Lewis presiding.

Presidential Address by Dr. Nolan D. C. Lewis.

Factors in Character Development, Neuroses, Functional Psychoses and Delinquency, by Dr. Margaret E. Fries. Discussion by Drs. Gregory Zilboorg, Spurgeon English, A. A. Brill and Margaret E. Fries (closing).

The Location of the Conflict Situation: An Orientation to the Problem of Delinquency, by Dr. Sidney Tarachow. Discussion by Drs. Isador H. Coriat, Eugen Kahn, David M. Levy and Sidney Tarachow (closing).

Hyperthyroidism and Personality, by Drs. Warren T. Brown and Edwin F. Gildea. Discussion by Drs. Fred P. Currier, Eugen Kahn, William L. Nelson, John A. P. Millet, Nolan D. C. Lewis and Warren T. Brown (closing).

The Experimental Neurosis and the Problem of Mental Disorder, by Dr. H. S. Liddell. Discussion by Drs. Thomas M. French and H. S. Liddell.

JOINT SESSION WITH THE SECTION ON MENTAL DEFICIENCY,
THURSDAY AFTERNOON, MAY 13, 1937.

Dr. R. H. Haskell presiding.

Psychotic Symptoms and Outcome of 1388 Cases Observed at the Walter E. Fernald State School, by Dr. Ransom A. Greene. Discussion by Drs. Thomas P. Brennan, Groves B. Smith, Neil A. Dayton, William W. Graves and Ransom A. Greene.

The Significance of Special Reading Disability in Mentally Handicapped Problem Children of Higher Grade, by Dr. G. Hegge. Discussion by Drs. Marion Monroe, Leo Kanner, Joseph Zubin and G. Hegge (closing).

The Appraisal of Intellectual and Physical Factors After Cerebral Damage in Children, by Drs. Bronson Crothers and Elizabeth Lord. Discussion by Drs. Groves B. Smith, Lloyd J. Thompson, Max H. Weinberg, Oscar J. Raeder, Robert H. Haskell and Bronson Crothers (closing).

Habeas Corpus Releases of Feebleminded Persons and Their Consequences, by Dr. Leo Kanner.

Development of Family Care in New York State, by Dr. Hiram G. Hubbell. Discussion by Dr. Kenneth B. Jones, Miss Hester B. Crutcher and Dr. Leo Kanner.

FRIDAY MORNING, MAY 14, 1937.

President Campbell presiding.

The Psychiatric Manifestations of Hypoglycemia, by Drs. Edwin J. Kepler and Frederick P. Moersch.

The Methodical Use of Hypoglycemia in the Treatment of Psychoses, by Dr. Manfred Sakel. Discussion by Dr. John R. Ross.

Experience with the Hypoglycemia Treatment of Schizophrenia, by Drs. Solomon Katzenelbogen, Herbert Harms and Dean A. Clark.

Further Experiences at Bellevue with the Hypoglycemia Insulin Treatment of Schizophrenia, by Drs. Joseph Wortis, Karl M. Bowman, Leo L. Orenstein and Irvin J. Rosenbaum.

Experience with the Hypoglycemia Shock Treatment of Schizophrenia, by Drs. G. Alexander Young, Richard H. Young and L. Roucek. Discussion by Drs. Bernard Glueck, Henry J. John, Julius Steinfeld, Gert Heilbrunn and Manfred Sakel (closing).

SECTION II. STUDIES ON HABITATION, TUESDAY AFTERNOON, MAY 11, 1937.

President-Elect Chapman presiding.

Personality and Sociological Factors in the Prognosis and Treatment of Chronic Alcoholism, by Drs. Kenneth J. Tillotson and Robert E. Fleming. Discussion by Drs. James J. Waygood, Gregory Zilboorg, Theodore Diller and Kenneth J. Tillotson.

Alcoholism and the Psychoneuroses, by Dr. William B. Terhune. Discussion by Drs. Fred Adams, Frank Curran and William B. Terhune.

Vitamin "C" Studies in Alcoholics, by Drs. Herman Wortis, S. Bernard Wortis, and Frances Marsh. Discussion by Drs. Edward E. Mayer, Stanley Cobb and Herman Wortis.

Clinical Studies of Drug Addiction: A Critical Review of the Withdrawal Treatments with Method of Evaluating Abstinence Syndromes," by Drs. Lawrence Kolb and C. K. Himmelsbach. Discussion by Drs. Walter Bromberg, Robert S. Carroll and Lawrence Kolb.

The Symptoms and Treatment of Barbital Intoxication, by Dr. Frank J. Curran. Discussion by Drs. Max Levin and Frank J. Curran.

BRAIN PATHOLOGY, WEDNESDAY MORNING, MAY 12, 1937.

Dr. J. Allen Jackson at first presiding, later Dr. Walter L. Bruetsch.

The Histopathology of the Psychoses with Subacute and Chronic Endocarditis, by Dr. Walter L. Bruetsch. Discussion by Drs. Fernand Longpre, Adolf Meyer and Walter L. Bruetsch.

Hereditary Form of Primary Parenchymatous Atrophy of the Cerebellar Cortex Associated with Mental Deterioration, by Dr. Andrew J. E. Akelatitis. Discussion by Drs. Adolf Meyer, David Rothschild and Andrew J. E. Akelaitis.

Defects of Intelligence Resulting from Lesions Within the Central Part of the Left Cerebral Hemisphere, by Dr. Leland B. Alford. Discussion by Drs. Charles Englander, Raymond C. Fagley, William Nelson and Leland B. Alford.

Circumscribed Cortical Atrophy in the Presenile Psychoses—Pick's Disease, by Dr. Charles Davison. Discussion by Drs. David Rothschild, Lloyd J. Thompson, Max H. Weinberg and Charles Davison.

Mental Changes Following Removal of the Right Cerebral Hemisphere for Brain Tumor, by Dr. Stuart N. Rowe. Discussion by Drs. Lloyd J. Thompson and Stuart N. Rowe.

JOINT SESSION ON PSYCHOANALYSIS AND THE AMERICAN PSYCHOANALYTIC ASSOCIATION, WEDNESDAY AFTERNOON, MAY 12, 1937.

Dr. R. H. Hutchings presiding at first, later Dr. Coriat in the chair.

Observations of Primitive Reactions in New Born Infants, by Dr. Margaretha Ribble. Discussion by Drs. Isador H. Coriat, A. A. Brill, Lawrence S. Kubie and Margaretha Ribble.

The Fantasy of Dirt, by Dr. Lawrence S. Kubie.

Remarks About the Relation of Inferiority Feeling to Guilt Feeling, by Dr. Franz Alexander.

Folie à Deux as a Clinical Picture and in Normal Life, by Dr. Helene Deutsch.

The Sense of Immortality, by Dr. Gregory Zilboorg. Discussion by Drs. David C. Wilson, Franz Alexander, George S. Sprague, Lawrence S. Kubie and Gregory Zilboorg.

HOSPITAL AND EXTRA-MURAL PROBLEMS, THURSDAY MORNING, MAY 13, 1937.

Dr. Winfred Overholser presiding.

Educational Functions of the Present Day Mental Hospital, by Dr. Arthur H. Ruggles and Dr. Charles P. Fitzpatrick. Discussion by Drs. William Nelson, Ira M. Altshuler, W. Scott Farmer, Gilbert Seaman and Arthur H. Ruggles.

Present Crisis in Social Relationships, by Dr. Samuel W. Hartwell. Discussion by Drs. George S. Stevenson, George Van Ness Dearborn and Samuel W. Hartwell.

A Constructive Criticism of Certain Hospital Procedures, by Karl M. Bowman. Discussion by Drs. Arthur P. Noyes, A. H. Braverman, Theodore Diller and Ira M. Altshuler.

Nursing Education, by Miss May Kennedy. Discussion by Dr. George H. Stevenson, Mr. Rowden and Miss May Kennedy.

Pre-Admission Care and Methods of Transfer of Psychotic Patients, by Dr. W. M. Bevis. Discussion by Drs. W. Scott Farmer, H. Curtis and W. M. Bevis.

THERAPEUTIC PROCEDURES, THURSDAY AFTERNOON, MAY 13, 1937.

President-Elect Chapman presiding at first, Dr. Titus H. Harris later.

Six Years' Experience with Narcosis Therapy in Psychiatry, by Dr. Harold D. Palmer and Dr. Francis J. Braceland. Discussion by Drs. Frederick L. Patry, Mary G. Schroeder, W. L. Moore, Harry A. Schneider, Julius Steinfeldt and Harold D. Palmer.

Treatment of the Psychoneuroses at Stockbridge, by Dr. Austen Fox Riggs and Dr. Gaylord P. Coon. Discussion by Drs. Harry M. Tiebout, Frederick J. Farnell, Theodore Diller and Isador H. Coriat.

Bibliotherapy and Mental Disorders, by Dr. William C. Menninger. Discussion by Drs. Merrill Moore, John E. Lind, Isador H. Coriat and William C. Menninger.

Paresis: An Analysis of Five Hundred and Eleven Treated Cases, by Drs. Robert A. Matthews, Robert S. Bookhammer, and William H. Izlar. Discussion by Drs. Francis J. Braceland and Meyer K. Amdur.

Influence of Calcium on Behavior, by Dr. Robert W. Robb. Discussion by Drs. Bettina Warburg, Theodora Wheeler and Robert W. Robb.

SECTION ON MENTAL DEFICIENCY, FRIDAY MORNING, MAY 14, 1937.

Dr. Oscar J. Raeder at first presiding, later Dr. R. H. Haskell.

The Differences in the Mental Reactions Between Children Suffering from Cerebral and from Cerebellar Tumors, by Dr. Leo M. Davidoff. Discussion by Drs. Max H. Weinberg and Leo M. Davidoff.

A Clinical Guide to the Study of Personality, Character and Behavior in Human Defectives, by Dr. Edward J. Humphreys. Discussion by Dr. Oscar J. Raeder.

Emotional Differences in Colored and White Inmates in a School for the Feeble-minded, by Dr. James Lewald. Discussion by Drs. S. L. Cohen and James Lewald.

The Relation Between Mental Level and Endocrine Disorders, by Dr. Matthew Molitch. Discussion by Drs. Hugh T. Carmichael, Robert H. Haskell and Matthew Molitch.

Heredity and Environment in Relation to the Mental Defective, by Dr. Jacob Sirkin. Discussion by Drs. James Lewald and Jacob Sirkin.

SECTION III. STUDIES FROM THE LABORATORY,
TUESDAY AFTERNOON, MAY 11, 1937.

Dr. J. Allen Jackson presiding.

Significance of Brain Potentials in Relation to Potentials in the Spinal Cord and Peripheral Nerve, by Drs. Edward A. Strecker, Joseph Hughes and Kenneth E. Appel. Discussion by Drs. David R. Clark, Edward A. Strecker, Herbert Jasper and Joseph Hughes (closing).

Sugar Content of the Blood and Cerebrospinal Fluid in Various Psychotic States, by Drs. E. P. Johns and G. H. Stevenson. Discussion by Drs. J. F. Bateman, Solomon Katzenelbogen, G. H. Stevenson and E. P. Johns (closing).

Kline Microprecipitation Reactions with Spinal Fluid, by Dr. Irving M. Derby. Discussion by Drs. Michael A. Burns and Irving M. Derby (closing).

Cerebrospinal Fluid Pressure in the Psychoses, by Dr. H. Beckett Lang. Discussion by Drs. James F. McFadden and H. Beckett Lang (closing).

The Irritative Therapy of Schizophrenia, by Dr. Emerick Friedman. Discussion by Drs. Myer K. Amdur, Solomon Katzenelbogen, Robert S. Carroll, Charles F. Read, G. H. Williams, S. W. Hartwell and Emerick Friedman (closing).

CLINICAL STUDIES, WEDNESDAY MORNING, MAY 12, 1937.

Dr. Oskar Diethelm presiding.

Studies in Obsessive Ruminative Tension States V. Etiology, Dynamics and Genesis of Psychasthenia, by Dr. Lawrence F. Woolley. Discussion by Drs. Frederick L. Wright and Lawrence F. Woolley (closing).

Post-Puerperal Psychoses, by Dr. Louis J. Karnosh. Discussion by Drs. John P. Powers, Erwin Wexberg and Louis J. Karnosh (closing).

The Arm-to-Carotid Circulation Time in the Mental Diseases, by Dr. Jacques S. Gottlieb. Discussion by Drs. Louis J. Doshay, Solomon Katzenelbogen, J. E. Finesinger, Louis J. Doshay and Jacques S. Gottlieb (closing).

Post-Operative Psychoses, by Dr. Milton M. Abeles. Discussion by Drs. Joseph L. Gilbert, George J. Wright, Louis J. Doshay, David R. Clark and Milton M. Abeles (closing).

Psychoses from Nutritional Deficiency, by Dr. Erwin Wexberg. Discussion by Drs. Siegfried Block and Erwin Wexberg (closing).

THERAPY. WEDNESDAY AFTERNOON, MAY 12, 1937.

Dr. G. H. Stevenson presiding.

The Psychiatrist's Roles with His Patients, by Dr. George S. Sprague. Discussion by Drs. Henry Harper Hart, Oscar Diethelm and George S. Sprague (closing).

One Hundred Years of Non-Restraint, by Dr. E. Messinger. Discussion by Drs. Henry L. Klopp and E. Messinger (closing).

A Socialization Program in the Treatment of Dementia Præcox, by Dr. O. R. Yoder. Discussion by Drs. Ernst L. Bagby, Ira Altshuler, Hugh S. Gregory, Frederick L. Wright and O. R. Yoder (closing).

Mental Reactions and Their Management in Patients with Cardiac Disease, by Drs. James H. Wall and Patrick H. Drewry. Discussion by Drs. Dexter M. Bullard, Frank Luton, Clarence O. Cheney and Patrick H. Drewry (closing).

Occupational Therapy in Facilities of the Veterans Administration, by Dr. Orren P. Goodwin. Discussion by Drs. Fred C. Smith and Richmond Berk.

CLINICAL PATHOLOGICAL STUDIES. THURSDAY MORNING, MAY 13, 1937.

Dr. Robert C. Woodman presiding.

Huntington's Chorea: A Genealogical Study of Two Families, by Drs. A. Lindenfeld and Max Rossman. Discussion by Drs. Percy R. Vessie and Eugene I. Falstein.

Psychoses with Cerebral Arteriosclerosis: A Clinicopathologic Study, by Dr. David Rothschild. Discussion by Drs. Naomi Raskin, Arthur P. Noyes, Jacob Kasanin and H. W. Williams.

Correlations of Behavior and Neuropathology in a Case of Cerebral Palsy from Birth Injury, by Dr. Arnold Gesell. Discussion by Drs. Bronson Crothers and Arnold Gesell (closing).

Clinicopathologic Considerations for Differential Diagnosis Between Juvenile Paresis and Other Forms of Encephalitis, by Drs. A. Ferraro, S. E. Barrera and H. S. Gregory. Discussion by Drs. Coyt Ham and Diomede Guertin.

Pathological Physiology of Acute Insanity, by Dr. S. DeWitt Ludlum. Discussion by Drs. Albert C. Buckley and S. DeWitt Ludlum (closing).

OPEN MEETING OF AMERICAN PSYCHOPATHOLOGICAL ASSOCIATION.

THURSDAY AFTERNOON, MAY 13, 1937.

Dr. Nolan D. C. Lewis presiding.

Experimental Study of Conceptual Thinking in Schizophrenia, by Dr. Jacob Kasanin. Discussion by Drs. Eugen Kahn, Paul Schilder, Gregory Zilboorg, George S. Sprague and Jacob Kasanin (closing).

The Interpersonal Element in Schizophrenic Thought, by Dr. Hiram K. Johnson. Discussion by Dr. Harry Stack Sullivan.

Parental Conflicts in Relation to Children, by Dr. Gregory Zilboorg. Discussion by Drs. David C. Wilson, Sarah R. Kelman, Erwin Wexberg and Gregory Zilboorg (closing).

Flight from Reality Through Loss of Sense of Personal Identity—Depersonalization, by Dr. Cornelius C. Wholey. Discussion by Drs. B. C. Schiele, Clarence P. Oberndorf, Paul Schilder, Eugen Kahn and Cornelius C. Wholey (closing).

The structure and Origin of the Delusion, by Dr. Fritz Kant. Discussion by Drs. Paul Schilder, George S. Sprague, L. H. Horton, Eugen Kahn, Fritz Kant (closing) and L. H. Horton.

FRIDAY MORNING, MAY 14, 1937.

Dr. L. N. Ziegler presiding.

Cardiovascular Disease in Neuropsychiatric Patients, by Dr. Bennie A. Moxness. Discussion by Drs. Nolan D. C. Lewis, Walter Bruetsch, Emanuel Messinger and Bennie A. Moxness (closing).

A Value of "Free Association," in State Hospital Practice, by Dr. Morris W. Brody. Discussion by Drs. William W. Elgin, Leo Kanner, L. N. Ziegler, Joseph Zubin, G. H. Preston, John D. Benjamin and Morris W. Brody (closing).

The Clinical Value and Diagnostic Reliability of the Rorschach Test, by Drs. John D. Benjamin, Franklin G. Ebaugh. Discussion by Drs. Joseph Zubin and John D. Benjamin (closing).

Psychopathological Effect of Adrenalin and Mecholyl on Patients in States of Anxiety, by Drs. Erich Lindemann and J. E. Finesinger. Discussion by Drs. Harry Stack Sullivan, John D. Benjamin, L. N. Ziegler, Joseph Zubin, George F. Southerland and Erich Lindemann (closing).

A Psychiatric Study of Carsickness in Children, by Dr. Jacob H. Conn. Discussion by Drs. Charles W. Stephenson, Erich Lindemann and Jacob Conn (closing).

ROUND TABLE DISCUSSIONS.

THURSDAY EVENING, MAY 13, 1937.

CHILD PSYCHIATRY.

Moderator: Dr. David M. Levy.
Discussants: Drs. David Slight, George S. Stevenson, Norvelle C. Lamar (by invitation), and Samuel W. Hartwell.

OCCUPATIONAL THERAPY.

Moderator: Dr. C. Charles Burlingame.
Discussants: Drs. Earle V. Gray, William Rush Dunton, Jr., Frank F. Tallman, Mrs. Eleanor C. Slagle (by invitation), and Miss B. Nelson (by invitation).

PSYCHIATRIC NURSING.

Moderator: Dr. George H. Stevenson.
Discussant: Mae Kennedy, R. N.

PSYCHOANALYSIS: ERRONEOUS ATTITUDES CONCERNING THE RÔLE OF SEX IN PSYCHOSES AND PSYCHONEUROSES.

Moderator: Dr. Leland E. Hinsie.
Discussants: Drs. A. A. Brill, J. Benjamin, Louis Casamajor, Isador H. Coriat, Helene Deutsch (by invitation), Paul Schilder and Lloyd H. Ziegler.

PSYCHIATRIC PRIVATE PRACTICE.

Moderator: Dr. Leslie B. Hohman.
Discussants: Drs. Bernard Glueck, Roger S. Cohen, W. W. Young, Theodore Diller, Grace Baker, Edward E. Mayer and Siegfried Block.

PSYCHOSOMATIC RELATIONSHIPS.

Moderator: Dr. H. Flanders Dunbar.
Discussants: Drs. M. Ralph Kaufman, Robert B. McGraw, Clarence P. Oberndorf, Karl A. Menninger, William Menninger, Franz Alexander and George Wilson.

SCIENTIFIC METHOD IN PSYCHIATRY.

Moderator: Dr. Jacob Kasanin.
Discussants: Drs. Adolf Meyer, Nolan D. C. Lewis, E. Morton Jellinek (by invitation), Stanley Cobb, John C. Whitehorn and Gregory Zilboorg.

THE VETERANS ADMINISTRATION.

Moderator: Dr. Appleton H. Pierce.
Discussants: Drs. George Van Ness Dearborn, Noble D. Leonard and others.

TUBERCULOSIS IN MENTAL HOSPITALS.

Moderator: Dr. Henry L. Klopp.
Discussant: Dr. George Clair Brink (by invitation).

FORENSIC PSYCHIATRY. CRIMINALITY.

Moderator: Dr. Vernon C. Branham.

1. Dr. Eugene Davidoff—"The Development of Clinics in Hospitals or in University Out-Patient Departments as a Means of Service to Delinquents."
2. Dr. Frederick H. Allen—"Clinics in Connection with Children's Court Work."
3. Dr. James McCartney—"The Use of Travelling or Itinerant Child Guidance Clinics as a Service to Courts in the Rural Districts."
4. Dr. Paul Schroeder—"The Functioning of Psychiatric Clinics in Courts Handling Adult Delinquency."
5. Dr. Matthew Molitch—"The Use of Parole Clinics for the Examination of Delinquents."

HYPOGLYCEMIA.

Moderator: Dr. Bernard Glueck.

WILLIAM C. SANDY, M. D., *Secretary-Treasurer.*

REPORTS OF COMMITTEES.

The following reports of Committees and of the Secretary-Treasurer were presented to the Association and approved by it during the convention sessions in Pittsburgh, Pennsylvania, May 10 to 14, 1937.

Report of the Executive Committee.

Following the personal investigation of hotel facilities in Pittsburgh by the Secretary and Executive Assistant and upon their recommendation, the Executive Committee selected the William Penn Hotel at Pittsburgh for the 93d annual meeting and the time May 10 to 15, 1937.

The Executive Committee met at the Hotel Commodore, New York, 2.30 p. m., December 28, 1936, all members being present.

The question of designating the place and time of meeting of the Association two years in advance in order to insure satisfactory arrangements as to the hotel, program and so on was generally discussed but no action taken, the subject to be considered later by the Council.

The Secretary recommended the establishment of a trust fund for the conservation of the finances of the Association. The Executive Committee upon motion of Dr. Overholser, seconded by Dr. Chapman, voted to recommend to the Council the consideration of the establishment of a trust fund and a study of the various kinds of trust fund that might be desirable, for report at a May, 1937, meeting.

Upon the motion of Dr. Chapman, seconded by Dr. Overholser, the Executive Committee voted to recommend to the Council that Austin M. Davies be continued another year as Executive Assistant and that his salary be increased to $3600 per annum.

The Executive Committee also voted to recommend to the Council to increase the salary of Miss Dorothy Rubenstein, stenographer-clerk at the New York office of the Association, to $1350 per annum.

The Secretary suggested increasing the dues of members to $7 annually, at present there being no distinction between members and associate members, the dues of both classes being $5. The committee decided to recommend to the Council that the dues of members be made $7.

The committee adjourned at 3.45 p. m.

The Council met at the Hotel Commodore, New York, at 3.45 p. m., December 28, 1936, there being 22 members present. President Campbell in the Chair.

The Chairmen of the various committees submitted preliminary statements.

Dr. Cheney, of the Board of Examiners, reported progress, there being at present 121 applications for membership.

Dr. Hall of the Program Committee stated that 70 papers have already been offered, there being time at the St. Louis meeting for about 50. There will be on one afternoon a symposium on "What child psychiatrists gain as experience of value to psychiatrists in general." All sections except that on mental deficiency have been contacted and the program arrangement will be similar to that of last year. Round tables have been suggested on the following subjects: Suicide, the scientific method in psychiatry, tuberculous patients in mental hospitals, physiological manifestations of psychobiological reactions, psychoanalysis, alcoholism, and Veterans Administration problems. Dr. Breutsch will as usual have charge of the scientific exhibits. Upon inquiry, Dr. Hall was advised that the Council approved arranging for a discussion of hypoglycemic shock treatment of dementia præcox.

Dr. Burlingame of the Committee on Public Education briefly reviewed the accomplishments in controlling the publicity of the St. Louis meeting and the efforts to promote public information. He asked for a ruling as to permitting the press to use graphs and charts. The Council referred Dr. Burlingame to the decision at the St. Louis meeting at which it was voted that "subject to the confirmation that such a procedure is the practice of the American Medical Association, the Committee on Public Education is authorized to give to the press copies of charts and illustrations with the consent of the authors of the papers," leaving the question within these limitations to the decision of the Chairman of the committee.

Dr. Frederick, on Arrangements, reported the plans of his committee with particular reference to the entertainment of members and guests. Included are a fashion show and bridge party, a luncheon and sightseeing trip for the ladies and special features for the evening banquet.

Dr. Farr, of the Committee on Research, discussed the geographical index of research projects, analysing subjects by locality. He also called attention to Dr. Breutsch's activities in arranging for the scientific exhibit. A member of the committee has suggested four possible responsibilities to be assumed by the Committee on Research, *i. e.* (1) to act as advisers on anticipated research problems; (2) to suggest topics for research; (3) to read manuscripts critically; (4) to indicate what funds or endowments might be available. Dr. Farr reported that he has received numerous statements covering the work of the National Research Council but he has found nothing of interest to the Association which he had not previously communicated.

Dr. Dayton, of Nomenclature and Statistics, favored continuation of the nomenclature in use about two years although there has been criticism of the section on psychoneuroses. He asked consideration of three points:

1. There are at present three classifications (a) psychoses and other mental conditions as used by the mental hospital group; (b) those used by the epileptic group; (c) and a third as used by the mental deficiency group.

2. At present, there is no separation in the statistical tables of first and readmissions in discharge and death compilations.

3. There should be closer cooperation between the Association and the Bureau of Census in the selection of statistics to be published.

Upon motion of Dr. Cheney, seconded by Dr. Overholser, the Council voted approval of Dr. Dayton's suggestion that the mental deficiency and epileptic classifications now in use by those groups be included in the psychiatric classification.

The Council, after further favorable discussion of the recommendations of the Chairman of the Committee on Nomenclature and Statistics, authorized Dr. Dayton to consult with the Director of the Bureau of the Census at Washington and the payment of the necessary expenses of this trip.

Dr. Stevenson, of the Committee on Psychiatric Nursing, stated that no new applications for certification of training schools had been received and expressed the opinion that there will probably be a further reduction in the number of schools. This is not a discouraging sign but an indication of such higher standards as staffing with graduates or the establishment of post graduate or affiliated courses. Dr. Stevenson requested advice as to (1) publication of Miss Bailey's report without deletion; (2) new standards for nursing schools, the same to refer to future applicants; (3) should the committee secure data from all states and provinces as to schools giving postgraduate and affiliated courses.

In the discussion which followed, the consensus of opinion appeared to be in favor of the publication of Miss Bailey's report as written with no names of institutions to be mentioned.

The Council voted, upon motion of Dr. Cheney, seconded by Dr. Chapman, that the Committee on Psychiatric Nursing be authorized an expense of not more than $100 for the purpose of securing information from all states and provinces as to nursing schools giving postgraduate and affiliated courses.

Dr. Tyson, on Ethics, reported progress.

Dr. Noyes, Standards and Policies, stated that at a meeting of his committee to-day, three subjects were considered: First, the geographical distribution of mental patients in institutions as compared with the membership of the Association as submitted by Dr. Treadway. The committee suggests the desirability of taking steps to increase the membership in regions not now well represented. Second, the question of some action in view of the subversive political activities in Massachusetts. Third, the mental hospital survey. The committee feels that psychiatrists to be detailed for service in the survey should be of first assistant grade and that the honorarium should be $15 per day with expenses.

After much discussion, the Council, upon motion of Dr. Hamilton, seconded by Dr. Cheney, took the following action in regard to the Massachusetts situation.

The Council discussed and deplored the recent disregard of psychiatric standards in Massachusetts which ignored the needs and rights of the mentally ill and handicapped and which tended to disorganize their care in Massachusetts and directed the Executive Committee to draft a suitable resolution.

The Council approved the suggestion that the usual honorarium for psychiatrists serving in the survey shall be $15 per day and travel expenses, those detailed to be of not less than the first assistant or assistant superintendent grade with more compensation in special instances.

Dr. Overholser, Legal Aspects of Psychiatry, discussed the suggestion of the committee that much more could be accomplished if funds could be secured from some foundation to make possible the full time services of a secretary for the compilation of information and other activities.

Upon motion of Dr. Cheney, seconded by Dr. Brill, the Council authorized Dr. Overholser to approach some foundation for the purpose of securing funds for the use of his committee.

The Council adjourned 6.30 p. m. for dinner. At 8.30 p. m. the Council resumed.

Dr. Hartwell, on Psychiatric Social Service, requested suggestions as to the scope of his committee and the objective of the report. He was advised that the report is to the Council, that it should be not too long but a clear and uncomplicated discussion of phases of social service as it relates to psychiatry. Long dissertations should be left for papers on the subject for presentation at some session of the Association.

In the absence of the Chairman, Dr. Ebaugh reported progress for the Committee on Psychiatry in Medical Education.

Dr. Farrar, Editor, announced that Dr. Nathaniel Brush has donated to the Association the file of the JOURNAL belonging to the late Dr. Edward N. Brush, which dates from 1844, to be for the use of the Editor. Owing to the increasing burden of gratuitous service on the Editorial Board, Dr. Farrar raised the question as to desirability of the annual appointment to the board. The Editor announced that arrangements have been made with Science Service in Washington to publish as monographs selected lengthy articles such as are published from time to time and which are too long for the JOURNAL, the Association to be given credit, and placing them on sale.

Dr. Farrar asked advice as to continuing the printing of discussions of papers.

The Council voted that the Editor be given full authority of editing and deciding whether or not discussions shall be printed.

The Council also voted that the members of the Editorial Board be appointed annually.

The Council directed the Secretary to express appreciation to Dr. Nathaniel Brush for the gift of the file of the AMERICAN JOURNAL OF PSYCHIATRY for the use of the Editor.

Dr. Buckley reported for the auditors that in their opinion, it is, under present circumstances, unnecessary for the Secretary-Treasurer to be bonded. No recommendation was made as to possible desirable change in the places of depository.

The Secretary read the resolution of the Executive Committee as to the establishment of a trust fund, after which, on motion of Dr. Hamilton, the Council approved the suggestion, referring the question of a trust fund to the Executive Committee for investigation and report at the May meeting.

The question of selecting the time and place of meeting of the Association two years in advance aroused much discussion. The Council finally adopted the suggestion of Dr. Hamilton, seconded by Dr. Buckley that beginning in

1937 for 1939 requests for designation of a city or a region as the place of meeting of this Association shall be submitted in writing not later than November first of the second year preceding the meeting.

Upon motion of Dr. Jackson, seconded by Dr. Williams, the Council approved the reappointment of Austin M. Davies as Executive Assistant for one year, his salary to be $3600 per annum.

Dr. Williams then moved, Dr. Brill seconded, and the Council voted to increase the salary of Miss Dorothy Rubenstein, stenographer-clerk to $1350 per annum.

The Council voted to remit the dues and to accept the resignations of Dr. Reginald S. E. Murray, Gardner, Mass., and Dr. Frank C. Richmond, Madison, Wisc., at their request, on account of serious illness.

The Secretary reported that word had been received from Dr. Henry B. Ward, Permanent Secretary of the American Association for the Advancement of Science that The American Psychiatric Association has been accepted as an affiliated Society with an invitation to send a representative to the Atlantic City meeting this week.

The Secretary was instructed to write to the Permanent Secretary of the American Association for the Advancement of Science that on account of the short notice, the Association was unable to designate a representative for the Atlantic City meeting.

The Council adjourned 10.50 p. m.

At subsequent conferences of members of the Executive Committee the following resolution was prepared and later approved by mail by all members of the Committee:

Resolution.

At the direction of the Council of The American Psychiatric Association, the Executive Committee prepared the following resolution in reference to the situation in Massachusetts:

"Deep concern is felt over the recent appointments in Massachusetts. The best interest of the mentally sick and handicapped and of their distressed families can only be served when those in authority encourage continuity of service and insist on recognized professional qualifications and breadth of experience.

In order that such a policy prevail, steps should be taken to make the real issues clear to those in authority and to the general public.

Be It Therefore Resolved, That the Editor of THE JOURNAL insert in an early number an editorial dealing with the situation.

Be it also resolved to bring the situation to the attention of the National Committee for Mental Hygiene in order that constructive steps be taken for the maintenance of those high standards of care of the mentally sick and handicapped in Massachusetts which have given Massachusetts for so long an enviable position among the states.

Respectfully submitted,

C. MACFIE CAMPBELL, M. D., *Chairman,*
Executive Committee.

Report of the Secretary, 1936-37.

The following is a statement of the membership of The American Psychiatric Association as of April 15, 1937.

HONORARY MEMBERS.

Former number	18	
Elected	1	
Present number		19

LIFE MEMBERS.

Former number	54	
Fellows to Life Members	10	
Total		64
Died		5
Present number		59

CORRESPONDING MEMBERS.

Former number	3	
Member to Corresponding Member	1	
Present number		4

FELLOWS.

Former number	905	
Members to Fellows	19	
Total		924
Fellows to Life Members	10	
Resigned	6	
Dropped	2	
Died	19	
Total		37
Present number		887

MEMBERS.

Former number	617	
Associate Members to Members	6	
Elected	92	
Reinstatements	2	
Total		717

Member to Corresponding Member	1	
Members to Fellows	19	
Resigned	1	
Dropped	4	
Died	8	
Total		33
Present number		684

ASSOCIATE MEMBERS.

Former number	64	
Elected	21	
Total		85
Associate Members to Members		6
Present number		79

TOTAL MEMBERSHIP.

Honorary	19	
Life Members	59	
Corresponding Members	4	
Fellows	887	
Members	684	
Associate Members	79	
Total membership April 15, 1937		1732
Total membership April 15, 1936		1661

WILLIAM C. SANDY, M. D., *Secretary.*

REPORT OF TREASURER.

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS FROM APRIL 16, 1936, TO APRIL 15, 1937.

Total Balance, April 16, 1936		$28,569.21
Receipts.		
Dues from Members	$12,640.64	
Exhibits—1936 Convention	387.50	
Exhibits—1937 Convention	690.00	
Registration—1937 Convention	1.00	
Committee on Arrangements—1936 Convention	540.00	
Interest on Savings Accounts	535.09	
Total Receipts		14,794.23
		$43,363.44

Disbursements.

Executive Assistant	$ 3,150.00	
Clerical Salaries	1,363.75	
Rent	900.00	
Mental Hospital Survey Committee	1,649.40	
JOURNAL OF PSYCHIATRY	2,476.79	
Committee Expenses	807.84	
1936 Convention Expense	1,227.83	
1937 Convention Expense	240.85	
Reporting 1936 Convention	647.24	
Programs 1936 Convention	455.69	
1936 Exhibits Expense	242.25	
Directory Members	516.53	
Postage	302.00	
Bond—A. M. Davies	50.00	
Accounting	40.00	
General Expense	13.50	
Total Disbursements		14,083.67
Total Balance April 15, 1937 (see Schedule)		$29,279.77

AMERICAN JOURNAL OF PSYCHIATRY.

Statement of Cash Receipts and Disbursements from April 16, 1936, to April 15, 1937.

Bank Balance April 16, 1936		$ 1,832.47

Receipts.

Income from Subscriptions	$ 5,414.80	
Reprints	1,064.05	
Back Numbers	126.82	
Set of JOURNALS	300.00	
Advertising	2,064.94	
Total Receipts		8,970.61
		$10,803.08

Disbursements.

Printing	$ 7,860.79	
Editorial Assistance	904.02	
Postage	320.52	
Back Numbers and Postage	100.97	
Telephone and Telegraph	200.76	
Supplies	19.65	
Miscellaneous Expenses	31.96	
Total Disbursements		9,438.67
Bank Balance, April 15, 1937		$ 1,364.41

SCHEDULE OF BANK BALANCES, APRIL 15, 1937.

	Account No.	Balance.
Public National Bank		$ 2,188.55
Bank for Savings	1,342,532	3,493.17
Union Dime Savings Bank	1,115,778	6,362.71
Emigrant Industrial Bank	137,048	8,622.56
Bowery Savings Bank	258,266	8,612.78
Total		$29,279.77

TOTAL CASH RESOURCES.

American Psychiatric Association (as above)	$29,279.77
AMERICAN JOURNAL OF PSYCHIATRY	1,364.41
Total	$30,644.18

WILLIAM C. SANDY, M. D., *Treasurer.*

April 19, 1937.

Mr. Austin M. Davies, Executive Assistant, American Psychiatric Association, 2 East 103rd Street, New York City.

DEAR SIR:

As per your request, we have made an examination of the books and records of The American Psychiatric Association and of the AMERICAN JOURNAL OF PSYCHIATRY.

We present herewith the following statements which are in agreement with the books and reflect the cash transactions for the period under review.

*1. State of Cash Receipts and Disbursements for The American Psychiatric Association for the period April 16, 1936, to April 15, 1937.

*2. Statement of Cash Receipts and Disbursements for the AMERICAN JOURNAL OF PSYCHIATRY for the period April 16, 1936, to April 15, 1937.

*3. Schedule of Bank Balances and Cash Resources.

In connection with our audit of your records, we reconciled all bank statements, added all footings, analyzed cash receipts and disbursements and examined all vouchers.

Should you desire any additional information upon any item in this report, please do not hesitate to call upon me.

Respectfully submitted,

TUROFF AND GOLDSTOCK.

By A. A. TUROFF,

Certified Public Accountant.

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* NOTE.—These statements were used as the basis for the report of the Treasurer and appear in the foregoing report as submitted by the Certified Public Accountant.

Report of the Executive Assistant.

Your Executive Assistant herewith respectfully submits his annual report:

It is my pleasant duty to report that the past year was one of growth, the office accounts showing for the first time a favorable balance. There was a net increase of 71 in the membership with comparatively few delinquents in dues; there being 75 Fellows, 61 Members and 6 Associate Members still unpaid.

Although overhead was increased by salary raises and appropriations to the Mental Hospital Survey Committee, both the Association and the JOURNAL accounts have satisfactory balances.

Since May, 1936, we have secured 80 new subscriptions to the JOURNAL, of which 47 were the result of a special drive in December. The total number of subscriptions is now 543, which is a net increase of 40 since last May.

I am happy to report that all the commercial exhibit space for the Pittsburgh meeting was sold and will yield approximately $1,235.00.

Advertising revenues have also been satisfactory, receiving $1,728.24 from renewals and $492.00 in new contracts, an increase of $142.87 over 1936.

Your Executive Assistant has again cooperated in assisting the Secretary, the Board of Examiners, the Committee on Arrangements and the Committee on Program.

An attempt is being made to collect historical material of the Association and the JOURNAL. Contributions of this nature will be welcomed.

REPORT.

April 16, 1936–April 15, 1937.

INCOME		
New Business and Renewals		
New Subscriptions (80)	$ 480.00	
Renewal of Subscriptions	2,778.00	
New Advertising ($327.00 still due)	492.00	
Renewal on Advertising ($638.55 still due)	1,728.24	
Commercial Exhibits (May 1936)	800.00	
Total		$6,278.24
DISBURSEMENTS		
Office Expense		
Rent of Office	$ 900.00	
Telephone and Telegraph	200.76	
Office Supplies	19.65	
Postage	320.52	
Miscellaneous Expense	180.43	
Printing (letterheads, envelopes, etc.)	123.73	
Dorothy Rubenstein—Salary	1,243.75	
Austin M. Davies—Salary	3,150.00	
Total		$6,138.84

Very truly yours,

AUSTIN M. DAVIES.

REPORT OF COMMITTEE ON STANDARDS AND POLICIES.

At the 1922 meeting of the Association held at Quebec the following resolution was adopted:

"Whereas, The American Psychiatric Association is interested in securing the highest possible standards for the care of the mentally ill,

"*Be it Resolved,* That a permanent Committee on Standards and Policies shall be appointed by the President by and with the consent of the Council. . . . .

"It shall be the duty of this committee to prepare an annual report in relation to standards and policies regarding the treatment of the mentally ill."

The constructive work performed by this first committee under the chairmanship of Dr. W. L. Russell is well known to the Council and the Association. After a survey which was as extensive as was possible in the absence of funds necessary for the personal inspection of institutions the committee formulated the familiar outline of minimum standards that should be attained by an institution in order to be considered properly qualified for the care of mental patients. In an editorial discussion of this painstaking report the JOURNAL in the issue for October, 1924, commented: "When the work outlined in the report is undertaken it will require the expenditure of a vast amount of time and energy on the part of those having it in charge, and there must be available a considerable sum of money to meet the expense of the study of hospitals and hospital methods and personnel involved." Since the publication of the first report of the Committee on Standards and Policies subsequent reports of the committee have contained various recommendations as to surveys which should evaluate and promote the resources and agencies devoted to the institutional care of the mentally disabled. They have also contained discussions as to governmental policies and types of organization that tend to promote or to impair the quality of medical and psychiatric care. While recognizing that any approach to the problem of mental disorders, their prevention and enlightened treatment should be a much broader one yet it seemed that a survey of mental hospitals, with special reference to the standards of care and treatment of their patients, was the most urgent need and the only one for which funds might reasonably be expected to be available. It is with great satisfaction, therefore, that through the generosity of the Rockefeller Foundation and the cooperative association of the major national organizations and agencies interested in the subject, an exhaustive and critical study, not only of hospital administration and function, but also of the facilities of psychiatric institutions for under-graduate and graduate teaching and for research as well as of public policies pursued in dealing with this important medical, social and health problem has now been made possible. Editorial comments in the issues of the JOURNAL for September, 1936, and January, 1937, describe the organization and indicate the initial aims and activities of the Mental Hospital Survey Committee, the official body created to represent the various participating agencies.

It will be recalled that at its 1936 meeting the Association appropriated $5000 to be paid as honoria and as traveling expenses to members of the

Association assisting in the survey. In recent months one of the important duties of the Committee on Standards and Policies has been the preparation, in association with the Director of the Mental Hospital Survey Committee, of a list of members who might be qualified and available for institutional surveys in various regions. Unfortunately in not a few instances the demands of other duties made it impossible for particularly qualified members to accept assignments. It is a source of much satisfaction, however, that Dr. H. O. Colomb was able to devote a period of six weeks to a survey of hospitals in the South. His wide experience in mental hospitals and his acquaintance with that region rendered him particularly qualified. At the time of the writing of this report Dr. Colomb is the only physician engaged in surveying institutions whose expenses have been paid from Association funds. It is expected, however, that other surveys will soon be begun by psychiatrists jointly selected by the committee and the Director of the Mental Hospital Survey Committee.

On several occasions in recent years the Committee on Standards and Policies has referred to the pernicious influence of politics as they affect the care and treatment of mental patients. Although in several instances it has come to the attention of the committee that political influences were preventing the establishment of desirable standards of institutional care yet it refrained from mentioning any specific state where this was true. At a meeting of the Committee on Standards and Policies held in New York, December 28th, there was extended discussion concerning the removal for political reasons of two prominent Massachusetts psychiatrists possessing outstanding qualifications for the responsible administrative positions they occupied. In a preliminary report submitted to the Council on the same day the committee requested an expression of opinion as to the advisability of specific mention in its annual report concerning the deplorable change of policy in Massachusetts. The Council indicated its approval and then directed its Executive Committee to draft a resolution expressing concern over recent exercises of gubernatorial power which, it was believed, disregarded psychiatric standards and tended to disorganize the care of the mentally ill and handicapped in that state. Since this resolution and extended discussion concerning the subject are published in the January, 1937, issue of the JOURNAL in an editorial comment entitled "Serious Political Situation in Massachusetts," further presentation by the Committee on Standards and Policies of the wanton disregard of those principles which had formerly placed Massachusetts in an enviable position of leadership in the care of its mentally disabled is scarcely required.

ARTHUR P. NOYES, M. D., *Chairman*,
IRA A. DARLING, M. D.,
EARL D. BOND, M. D.,
WILLIAM C. GARVIN, M. D.,
CLARENCE B. FARRAR, M. D.,
MORGAN B. HODSKINS, M. D.,
WALTER L. TREADWAY, M. D.,
APPLETON H. PIERCE, M. D.,
J. ALLEN JACKSON, M. D.,
E. ARMITAGE BABER, M. D.

REPORT OF THE COMMITTEE ON LEGAL ASPECTS OF PSYCHIATRY, 1936-37.

The Committee on the Legal Aspects of Psychiatry respectfully presents its annual report:

A meeting of the committee was held in New York City in December, 1936, and the Chairman has been in touch with the members during the year, both by correspondence and personally. The committee has been hampered somewhat in its activities by the fact that so far it has found it impossible to arrange a meeting (such as has usually been held annually) with the Committee on Psychiatric Jurisprudence of the American Bar Association. An informal meeting of a representative of this committee with a member of the Bar Association and American Medical Association Committees was held last summer, however, when plans were briefly discussed.

In its report for 1936, the Committee on Psychiatric Jurisprudence proposed a continuing research into the actual extent of the application of psychiatry in the determination of the disposition of the offender. Your committee agrees heartily with this recommendation, and is of the further opinion that a corollary of this activity might well be the collection and dissemination of information regarding actual and desirable legal provisions as well as concerning medico-legal literature. Indeed, the publication at regular intervals of a critical survey of the developments and possibilities in the interrelated fields of criminology and psychiatry might well be considered. At the December meeting, the Council authorized the chairman to request from one of the foundations a subsidy for this purpose. It was estimated that with the sum of about $15,000 a permanent secretary could be employed, who could carry on such activities under the guidance of the committee. It was hoped that the American Bar Association would join in this request, since they made a similar proposal in 1930. Owing to certain technicalities, however, their consent has not yet been obtained, so that the formal application has not been made. The establishment of a permanent bureau of this sort would enable the committee to be of considerable assistance to law-drafting and legislative bodies, as was suggested in this committee's report last year. It is to be hoped that the coming year will see the fruition of this plan.

Ten years ago this committee, under the chairmanship of Dr. Karl A. Menninger, presented a report which embodied a "credo" and outlined certain desiderata. Some progress in accomplishing those aims can be recorded, though much remains to do.

During the past year the U. S. Public Health Service, in conjunction with the Department of Justice, established a psychiatric service for certain of the U. S. District Courts. Diplomates of the American Board of Psychiatry and Neurology have been designated as consultants, and are available to advise the court concerning the mental condition of the defendant if such advice is requested by the court. A service of such standards, readily accessible, is almost certain to demonstrate its value promptly and to result in an increased appreciation of the aid which can be rendered by psychiatry to the administration of the criminal law.

The New York State and County Medical Societies and the New York Academy of Medicine, through their committees, are continuing active cooperation with a committee of the New York City Bar Association in attempting to solve some of the perplexing problems relating to medical expert testimony.

Your committee is vitally interested in improvement of the laws relating to the commitment of the mentally ill. In all too many states, antiquated proceedings, savoring of the criminal, are the rule—"lunacy commissions," the requirement of notice to the patient, and even jury trial on the charge of "insanity," are found on the books, and all militate against the humane treatment of the patient and tend to discourage early care. It is especially distressing to note that the most barbarous laws of all are found where progress shold be looked for, namely in the District of Columbia. According to the New York Times for June 29, 1936, a certain congressman who had had the misfortune to develop a psychosis which was brutally advertised by the daily press "was scheduled to appear before a lunacy court—to defend himself against charges that he was dangerous and an 'unfit person to be at large.' The hearing was dismissed upon his transfer to a private hospital." A bill is now pending in Congress (S. 1225) to bring about some slight improvement in the commitment laws of the District. Your committee plans to secure data concerning desirably simple commitment procedures, and possibly to draft a model bill which, while protecting the legal rights of the patient, is humane and progressive.

Very few legislative proposals of interest have come to the attention of the committee. In Oregon (H. 143) a bill proposes to authorize the court to order a party to a case to submit to a mental or physical examination if his mental or physical condition is a matter involved in the case. In Massachusetts (H. 524) a bill to set minimum standards for court-appointed experts in criminal cases was defeated.

The committee has suffered a grievous loss in the death of Dr. William A. White, long an interested and active member. No one in this country has fought more vigorously and effectively for a decent and intelligent attitude toward the mentally abnormal defendant or toward the person in need of commitment than Dr. White. A man of profound erudition and broad human sympathy, he was ever ready to contribute his sage advice on the topics considered by the committee. The psychiatric world has lost a figure of gigantic stature; his like will not soon be seen again.

Respectfully submitted,
WINFRED OVERHOLSER, M. D., *Chairman.*
V. C. BRANHAM, M. D.,
BERNARD GLUECK, M. D.,
MENAS S. GREGORY, M. D.,
SAMUEL W. HAMILTON, M. D.,
WILLIAM HEALY, M. D.,
RAYMOND F. C. KIEB, M. D.,
LEROY M. A. MAEDER, M. D.,
PAUL L. SCHROEDER, M. D.

REPORT OF THE COMMITTEE ON NOMENCLATURE AND STATISTICS.

To the Council of the American Psychiatric Association:

The committee wishes to bring to the attention of the Association the following four points:

(1) Report of the action of the Bureau of the Census in connection with the separation of the Census statistics on Mental Deficiency and the Convulsive Disorders.
(2) Comment on the more accurate reporting on overcrowding in State Hospitals by the Journal of the American Medical Association.
(3) Suggested change in recommended tables to divide statistics on discharges, deaths and resident population into first and readmissions.
(4) Suggested change to include the clinical classifications of Convulsive Disorders and Mental Deficiency in the present Psychiatric Classification.

(1) The committee reports that the Bureau of the Census accepted the resolve passed by the Council last year in reference to (a) the division of the report on institutions for mental defectives and hospitals for epileptics into two separate sections, and (b) the basing of the newly separated tables in this report upon the clinical classifications of mental deficiency and convulsive disorders, in accordance with the Standard Classified Nomenclature of Diseases. The Bureau cooperated by making the both changes immediately. Beginning with 1936, the publication of the Census Bureau known as "Mental Defectives and Epileptics in Institutions" will be published in two separate sections, one devoted to institutions for mental defectives and the other section to institutions for epileptics. In this way the mixture of classification which characterized early reports will be avoided and a more satisfactory view of nation-wide statistics on these two subjects will be available.

(2) It is gratifying to report that the 1937 Hospital Number of the *Journal of the American Medical Association* has given a much more thorough discussion and treatment of the state hospital situation than in previous years. About eighteen months ago the present chairman of the committee communicated with the *Journal of the American Medical Association* and brought to their attention the serious error which was resulting from their reporting of the "number of beds" in mental hospitals rather than the rated capacity. Past reports recorded a fictitious "under capacity" condition based upon a comparison between the number of beds and the average daily number of patients in institutions. As every institution had a few more beds than patients, this gave the impression that mental hospitals were well within their capacity when, in fact, many of them were greatly overcrowded. This year the JOURNAL statistics included a new item of "Rated Capacity" which immediately revealed the excess of patients in many state hospitals. It is pleasing to note that the 1937 Hospital Number of the *Journal of the American Medical Association* replaces the misleading presentations of former years with an accurate analysis of overcrowding in state hospitals.

(3) Over the past years the official statistics as recommended by The American Psychiatric Association have included a primary division of cases coming into mental hospitals into first admissions and readmissions. However, statistics on discharges, death and resident population have been grouped

without this differentiation. One state (Massachusetts) has made this distinction in its institutional and state-wide statistics. It has been found that when discharges and deaths are divided into first admissions and readmissions, these two subdivisions show differing characteristics. First admissions discharged, for example, are not of the same age composition as readmissions discharged, nor do they show the same proportions of the different psychoses. There is also a distinct difference in the length of hospital stay of first admissions discharged and readmissions discharged. The same is true of the deaths. The resident population shows even more marked differences.

The committee wishes to bring up the question of giving discharges, deaths and resident population the same consideration which is now being given to admissions. The suggestion is made that the statistics of The American Psychiatric Association be revised to include a division of the present tables referring to discharges and deaths into first and readmissions. It is also suggested that the Bureau of the Census be requested to divide its annual statistics on discharges and deaths in this manner, and that its occasional reports on resident population include this same division into first and readmissions. It is felt that a division of our statistics on mental diseases in this manner will make possible a more satisfactory analysis of patients leaving mental hospitals, those dying and those remaining in the resident population. To continue to throw these dissimilar groups together will only continue to cloud our results indefinitely in reference to the matter of outcome.

(4) The use of the new classification of the Standard Nomenclature of Diseases in respect to mental disorders, convulsive disorders and mental deficiency has introduced certain difficulties. The division of the large field of psychiatry into three subdivisions has resulted in the use of three clinical classifications which offer somewhat different descriptions of the same condition. For example, at the present time the mental hospitals classify epileptics in two groups, either "Psychosis with Convulsive Disorders (Epilepsy)" or "Without Psychosis—Epilepsy" while hospitals for epileptics are using the new detailed clinical classification of the Standard Nomenclature. Here we have two different methods of diagnosing convulsive disorders (non-psychotic), all within the same state hospital group. The same is true in mental deficiency. The mental hospitals use the two classifications "Mental Deficiency with Psychosis" and "Without Psychosis—Mental Deficiency," while the state schools are using the detailed classification as outlined by the Standard Nomenclature. Again two sets of state institutions are using two different systems of diagnosis. On the other hand, the hospitals for convulsive disorders and the state schools have tended to use their own clinical groupings without reference to the psychiatric classification. Occasionally, cases diagnosed as "Psychosis with Convulsive Disorders" are found to be schizophrenics. Again, in the state schools, the primary schizophrenia may be undiagnosed and the deteriorated state diagnosed as mental defect. It would be helpful to the medical staffs of both the epileptic hospitals and the state schools if they could have before them the well-defined groupings of the psychiatric classification to aid them in extending the scope and thoroughness of their diagnoses.

At the present time we cannot study the clinical groupings of the convulsive disorders on a state-wide or country-wide basis because of the two different diagnostic procedures in hospitals for epileptics and in mental hospitals. The same is true in the case of mental deficiency, because of the differing diagnostic criteria in mental hospitals and state schools for mental defectives.

A solution to this problem has suggested itself and is being proposed for the consideration of the Association. It is suggested that the clinical classification on epilepsy (pages 502-505 of the Standard Nomenclature) and also the clinical groups in mental deficiency (pages 95-96), with appropriate definitions, be included within the present psychiatric classification. This could be effected by amplifying the present grouping "without psychosis—epilepsy" to include the entire clinical classification of convulsive disorders. In like manner the heading "without psychosis, mental deficiency" would be expanded to include the clinical classification on mental deficiency.

The advantages of such an enlarged classification are immediately apparent. We would have but one system of diagnosis for use in all three types of institutions. The clinical groupings and definitions on the subjects of convulsive disorders and mental deficiency would be easily available to the medical staffs of mental hospitals. This would mean thorough clinical diagnoses on both mental deficiency and convulsive disorders before placement in the proper category. At the same time the availability of the well-defined psychiatric classification would aid the medical staffs of the epileptic hospitals and the state schools for mental defectives in arriving at a better understanding of the psychoses.

The committee wishes to bring to the attention of the Council the problem of a more satisfactory base mental age for the determination of intelligence quotients in adults. For some time opinions have been expressed that the present standard of 16 years is too high and should be reduced to 14 years. Many groups throughout the country have already adopted a 14 or 15 year level and the resulting discrepancies bring the entire matter of the use of the intelligence quotient into disrepute.

It is suggested that the committee study this problem in collaboration with the Section on Mental Deficiency, the American Association on Mental Deficiency and other interested groups, with the thought of determining a uniform standard. Changes deemed desirable will then be recommended to the Standard Classified Nomenclature of Diseases.

Respectfully submitted,

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FRANKLIN G. EBAUGH, M. D.,
CLARENCE B. FARRAR, M. D.,
GEORGE H. PRESTON, M. D.,
WALTER L. TREADWAY, M. D.,
JAMES V. MAY, M. D.,
E. STANLEY ABBOTT, M. D.,
WILLIAM T. SHANAHAN, M. D.,
CLARENCE M. HINCKS, M. D.

Report of the Committee on Psychiatric Nursing.

To the Council of The American Psychiatric Association:

The usual questionnaire was sent to all schools accredited by The American Psychiatric Association. Replies indicate that there is a steady decline in the number conducting undergraduate courses, only 46 being active and admitting students during this year, although several others are completing the education of students already entered. Six schools have discontinued during the year. One school formerly discontinued, resumed activity.

At first glance this might appear unfavorable, but on further inquiry it appears that this decline is more than counterbalanced by an increase in the number of post-graduate and affiliate courses in psychiatric nursing, and is more a reflection of a change in emphasis in the field of nursing education. This is discussed in greater detail later in this report.

The undergraduate schools appear for the most part to be in a fairly healthy condition. During 1936 these schools received 784 students, and graduated 449. All are accredited by their respective State Boards of Nurse Examiners and are complying with adequate standards. Without exception their students have at least a 12 months affiliation in general hospitals for the subjects which cannot be adequately taught in the home school. There is steady improvement in housing, recreation facilities, hours of duty, etc., the most noteworthy advance in this direction being the general adoption of the 48-hour week for both day and night duty in the New York State Hospital system.

The ratio of nursing staff to patients continues to improve, although in many hospitals many more nurses, students and graduates, could be employed to advantage. The lack of nursing staff in the male wards of many hospitals is to be deplored. It should be obvious that sick men need nursing care just as much as sick women. While certain wards in all mental hospitals may not be suitable for women nurses, the use of male nurses on these wards presents no obstacles, and questions pertaining to the training of a sufficient supply of male nurses are being considered by the committee. Certain information concerning nursing schools accepting male students has been elicited by a supplementary questionnaire referred to below.

About half the schools report difficulty in securing suitable applicants. When it is noted that among the 46 schools reporting, there were only 449 graduates, it may be that the difficulty is general and hospital administrators appear to be giving serious consideration to the question whether or not their undergraduate schools should be discontinued. It is noted that the state of Illinois has abandoned its undergraduate course in all its state hospitals.

In an attempt to learn to what extent post-graduate and affiliate courses are available, a supplementary questionnaire was sent to the Secretary of the Board of Nurse Examiners of each state and province. Replies were received from every state and province (with the exception of Utah). The following questions were asked:

1. Names and addresses of hospitals offering post-graduate courses in psychiatric nursing.

2. Names and addresses of hospitals offering affiliate courses in psychiatric nursing.

3. Names and addresses of schools of nursing in other than psychiatric hospitals which give their undergraduate students a course in psychiatric nursing as a part of their basic training, by an affiliation in a psychiatric hospital or through a psychiatric division or ward in the home school.

4. Names and addresses of all hospitals whose schools of nursing accept and train male students.

The replies to these questions are listed below.

United States.	Question 1.	Question 2.	Question 3.	Question 4.
Alabama	0	0	0	0
Arizona	0	0	0	0
Arkansas	0	0	0	0
California	0	4	6	5
Colorado	1	1	5	0
Connecticut	1	2	7	0
Delaware	0	1	3	0
District of Columbia	1	2	6	0
Florida	0	0	2	1
Georgia	1	0	0	0
Idaho	0	0	0	0
Illinois	1	3	12	4
Indiana	0	0	1	0
Iowa	1	0	1	0
Kansas	1	1	5	1
Kentucky	0	0	1	1
Louisiana	0	0	1	0
Maine	0	0	0	2
Maryland	3	3	15	1
Massachusetts	2	5	15	4
Michigan	1	0	6	0
Minnesota	0	1	10	0
Mississippi	0	0	0	0
Missouri	1	0	4	1
Montana	0	0	0	0
Nebraska	0	1	5	0
Nevada	0	0	0	0
New Hampshire	1	1	6	0
New Jersey	1	2	22	2
New Mexico	0	0	0	1
New York	2	17	69	18
North Carolina	1	1	1	0
North Dakota	0	0	0	0
Ohio	1	3	23	0
Oklahoma	0	0	0	0

United States.	Question 1.	Question 2.	Question 3.	Question 4.
Oregon	0	0	2	0
Pennsylvania	3	5	22	5
Rhode Island	0	1	2	1
South Carolina	0	1	3	0
South Dakota	0	0	0	0
Tennessee	0	0	2	2
Texas	0	0	1	2
Utah	?	?	?	?
Vermont	0	0	0	0
Virginia	0	0	5	1
Washington	2	1	4	1
West Virginia	0	0	0	0
Wisconsin	1	1	10	0
Wyoming	0	0	0	0
	26	57	277	53

Canada.	Question 1.	Question 2.	Question 3.	Question 4.
Alberta	1	0	0	1
British Columbia	1	0	0	0
Manitoba	1	1	3	2
Nova Scotia	0	0	0	4
New Brunswick	0	0	0	0
Prince Edward I.	0	0	0	0
Quebec	1	0	0	0
Saskatchewan	2	0	1	0
Ontario	1	2	7	0
	7	3	11	7

United States	26	57	277	53
Canada	7	3	11	7
Total	33	60	288	60

Your committee is of the opinion that these figures are encouraging and re-assuring and indicate a definite trend in the direction of making psychiatric nursing a part of the training of all nurses and a definite recognition of the importance of psychiatric nursing. The establishment of a State School of Psychiatric Nursing in Illinois and the appointment of a Director of Psychiatric Nursing for Minnesota, and the real interest shown in the development of psychiatric nursing by many other nurse educators, are indications of the increasing importance and value of such courses.

The fourth question, relating to male nursing, has no direct relationship to the other questions, but was asked in order to give the committee some idea of the facilities which exist at present for the training of male nurses.

The report of the survey conducted by Miss Harriet Bailey, under the joint direction of the National League for Nursing Education and The American Psychiatric Association, was printed in the *American Journal of Nursing* for May, 1936, and reprinted in the JOURNAL of our Association for January, 1937. Your committee is of the opinion that the findings, conclusions and recommendations made are of extreme importance and value for the establishment of better standards of nursing care of the mentally ill and for the education of nurses in this field. Your committee plans to re-consider the standards for schools of nursing accredited by The American Psychiatric Association in the light of Miss Bailey's survey and hopes to make a definite report on standards a year hence.

A conference was held with Miss May Kennedy, Chairman of the Committee on Mental Hygiene and Psychiatric Nursing of the National League of Nursing Education, in December, and Miss Kennedy's offer to present a paper to our Pittsburgh meeting was gratefully received and passed to the Chairman of the Program Committee, which has arranged for it on the program.

Your committee regret the loss of Dr. Chapman as chairman but congratulate him and the Association on his elevation to the office of President-Elect. We are pleased that he continues on the committee and his advice on various occasions has been of great value to us.

All of which is respectfully submitted.

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CHARLES P. FITZPATRICK, M. D.,
HENRY I. KLOPP, M. D.,
ARTHUR P. NOYES, M. D.,
ROSS MCC. CHAPMAN, M. D.,
WILLIAM D. PARTLOW, M. D.,
GEORGE F. INCH, M. D.,
MORGAN B. HODSKINS, M. D.,
G. H. WILLIAMS, M. D.,
PAUL G. TADDIKEN, M. D.

REPORT OF THE COMMITTEE ON PSYCHIATRY IN MEDICAL EDUCATION.

The Committee on Psychiatry in Medical Education is pleased to report continued progress. The committee continues to have the benefit of close and fruitful collaboration with the Division of Psychiatric Education of National Committee for Mental Hygiene. The following information from the files of the division furnishes a perspective concerning the present situation of psychiatry in medical education.

The rating of sixty-eight (68) medical schools would indicate that nineteen (19) give excellent psychiatric instruction, thirty (30) are good in this respect and nineteen (19) are indifferent or poor.

The psychiatric faculty standards were investigated in 68 medical schools in regard to (1) training and experience, (2) number of hours spent in teaching, and (3) productivity. In these points 22 are excellent, 30 good, 16 indifferent to poor.

The average number of hours devoted to the teaching of psychiatry was 76, 48 in 1931-32, and in 1936-37 there was a gratifying increase to 86.9.

In 1932, 32 schools gave preclinical instruction and in 1936 this was raised to 44 schools, being an increase of 37 per cent.

The preclinical courses are designated in various ways: In 19 schools psychobiology; in 15 psychopathology; in 11 medical psychology; in 1 psychiatry; in 1 neuropsychiatry; in clinical psychology; in 3 introduction to psychiatry; in 1 basic human relations; in 2 mental hygiene; in 1 biopsychology; in 1 clinics and lectures on normal and abnormal psychiatry; in 1 psychiatry and mental hygiene; and in 1 general psychopathology. The committee recommends that an attempt be made to standardize the designations of the preclinical courses. The names psychobiology and psychopathology are satisfactory. In any event we feel that the designations of these courses should indicate in some way a relative comparison with the basic medical sciences such as physiology, anatomy and histology and later, a comparison with morbid anatomy and organic pathology.

The appraisal shows that the average number of teachers in the department of psychiatry in 1931-32 was 4.66 and in 1936-37 this average was 7.28.

Clinical facilities were good in 25 medical schools; fair in 21 and inadequate in 22.

The committee is in accord with the recommendations of the Division of Psychiatric Education that there should be greater emphasis on preclinical teaching and that psychiatry should be organized in the teaching curriculum as a separate department.

The committee suggests that every effort be made to increase the amount of psychiatric experience afforded to internes in general hospitals. In this connection, Dr. Henry Christian, of Harvard Medical School, an eminent internist and professor of medicine, has furnished a splendid example.

The committee desires to express its grateful appreciation to one of its members, Dr. Franklin G. Ebaugh, for having borne the labor of fact finding.

Respectfully submitted,

EDWARD A. STRECKER, M. D., *Chairman*,
ADOLF MEYER, M. D.,
FRANKLIN G. EBAUGH, M. D.,
LLOYD H. ZIEGLER, M. D.,
GEORGE S. AMSDEN, M. D.

REPORT OF THE COMMITTEE ON PUBLIC EDUCATION.

Your Committee on Public Education feels more strongly than ever before that the best interests of psychiatry would be served, and a great deal done toward preserving whatever gains we have made, if the Association would enter whole-heartedly into the organizing of a well-equipped, full-time department of public education.

There are specific examples of the value of such an organization as, let us say, the New York Academy of Medicine, and which exercises a potent influence in the community because it has built up a confidence in the press and in the public mind by continued, reliable and temperate educational work. This "good will" if we may call it that, is a valuable asset when the public interest demands that certain situations be clarified by authoritative utterance of a dispassionate, professional group.

The most important and soundest distribution of information concerning mental disease goes into the public through the services rendered to patients and the families, and family physicians. When the physician takes pains to cultivate the language of fact, and translates them into understandable simplicity intelligent conceptions of mental disease can become more prevalent.

At the same time, it is recognized that the press and radio can become conduits through which may flow good educational material, or sensational nonsense, depending upon the source of supply.

In order to interpret and comment on events of a psychiatric nature, particularly those of local interest this Committee believes it would be helpful to have in each region, certain individuals designated with their consent by the Committee for this purpose. While they would not assume to speak for the Association, they would by reason of their standing be in a position to disseminate information in their region. With the approval of the Council, this Committee would make such appointments.

If we are sincere in our belief in the importance of psychiatric principles and the maintenance of high standards, then we must do more than talk about it. We must be willing to take an aggressive stand any time those principles are assailed. If we are not willing to do this, then we should definitely announce ourselves as interested only in the theoretical phases of psychiatry and leave the practical problems to some other organization, medical or otherwise.

But it is not only in this respect that such an active, full-time organization is desirable. Throughout the year, the unsound, the scheming "quack" have access to the public press to announce through paid advertisements or otherwise, "remedies" and "sure cures" for mental ills. These "practical psychologists" and "leading psychoanalysists" as they style themselves are invariably without a medical degree. We should admire their acumen and their practical knowledge that where insufficient sound facts are available, unsound information is easily dispensed. It should be the duty of this Association to see that sound information is disseminated—not periodically, but through its organization, and regional committees, continuously, and through every orthodox medium.

To be effective, such a campaign of education must be affirmative. It is not enough merely to denounce—we must offer a substitute in the way of constructive planning through local and state societies, through regional committees, and through the Association itself.

In these, and many other ways, the Association would contribute to a sound understanding of psychiatry by the public, and by so doing, grow in

stature and strength. As psychiatrists, we know the desirability in human growth of passing on through childhood and adolescence to independent and emancipated adulthood. We believe the same is true of organizations. We are old enough and big enough to be thoroughly matured, but we are dodging our responsibilities in some respects.

Your committee has, in a modest way, made an effort to do some of these things, but we can make no pretense that they have been done adequately, or that they can be done adequately without a properly organized, full-time, day in and day out campaign of public education, with local committees functioning in each region.

The committee has continued to try to foster good relations with the press and it has found the national news agencies not only willing, but eager for authentic information. It is manifestly impossible to reach all local newspapers with our present organization.

We have also tried to cooperate with the Editor of the JOURNAL by collecting news notes from time to time of matters pertinent to psychiatry. We believe this particular section of the Journal could be developed into a useful and informative department through which members of the Association could be made aware of current developments in the national field of psychiatry.

The committee received excellent cooperation from the Committee on Arrangements in setting up facilities for the dissemination of information at the meeting of the Association in St. Louis, and recommend that similar arrangements be made in Pittsburgh this year.

C. CHARLES BURLINGAME, M. D., *Chairman*,
KARL M. BOWMAN, M. D.,
ADOLF MEYER, M. D.,
OSCAR J. RAEDER, M. D.,
*WILLIAM A. WHITE, M. D.

COMMITTEE ON PSYCHIATRIC SOCIAL SERVICE.

The Committee on Psychiatric Social Service on The American Psychiatric Association wishes to submit the following report. The committee feels that this report should be simply one pointing out to the Association certain important facts and situations that now exist in the field of social work in its relation to psychiatry. Therefore, no detailed information or statistical material on which this report is based, are given in this report.

The committee feels that the subjects discussed in this report are of such vital importance, and the decision that must soon be made by the psychiatric profession, are of such far reaching significance to the individual members of the Association and of society itself, that they should be studied carefully by the individual members and discussed in the meetings of the Association and its various sections. The committee also feels that definite authority should be vested in the committee, or in specially selected groups representing the executive committee to take official action from time to time in matters covered by this report.

* Deceased.

The committee would first call attention to the very remarkable growth of social work as a profession. This growth is manifest both by an increased number of schools and universities offering courses in social work and by the number of social workers now working who have received some form of training. This number has increased greatly in the past five years. Most of these trained or partially trained workers have had some training, in name at least, in psychiatry and mental hygiene. Some of them have had excellent training. Many of the members of the social work group have advanced to important positions such as: heads of agencies, public officials, especially in the public relief and planning fields, university teachers, judges in juvenile courts, law makers, official advisers, and cabinet members. These people are bringing into these fields what is usually called, "the psychiatric or mental hygiene approach." In these fields there is a very insufficient representation of psychiatrists specially interested in broad social problems. Many individuals that are non-medically trained are being used as psychiatric consultants.

Another important change is this: Until recently in the social work field, there was more or less sharp demarcation between the psychiatric social worker and what was known as the social case worker. Social case work has developed, and is changing rapidly and profoundly, and this demarcation, both in the training and in the practice, is less distinct than it was and its tendency is to disappear altogether. In practice, all social workers are becoming psychiatric social workers. The extramural psychiatrist cannot be expected alone to solve these problems nor can the psychiatrist alone do this. It has become a matter of great importance to the entire medical group.

With the rapid growth of social work as a profession, and the great increase in the scope of its activities, and because of the almost universal feeling among social workers that personality adjustments and mental deviations as well as mental disease, are an inseparable part of the problems the social worker must deal with after he meets the individual or the group, social workers feel that the psychiatric profession has, in a large measure, failed to keep pace with them in supplying the help they need. It is a recognized fact by all familiar with this field that were the number of psychiatrists now engaged in extramural and social psychiatry multiplied by one hundred, the psychiatrists themselves could not carry on the therapy, both simple and complex, in the fields that social work has already opened. Social work needs from the psychiatric profession the following things:

1. Help in setting up and maintaining standards of training for social workers, and supervision of students in training; mental hospitals as field training resources where a high calibre of social work is available for supervision.

2. Psychiatrists to teach mental hygiene and allied subjects in the schools of social work, and psychiatrists trained to give the type of consultation and treatment supervision the social worker needs and is being trained to use.

3. Social work needs from the general medical profession an increased interest in, and ability to help, the social worker with the problems of early mental disease, neurosis and personality deviations. Your committee feels that this is a very important need.

4. A clear and more generally accepted definition of the relation of the psychiatrist to the social worker, especially in the social workers' psychotherapeutic activities.

Psychiatry is now confronted with a very similar situation to that of the general medical profession 25 years ago when public health and personal hygiene representing the socialization of medical science first came to the notice of the entire country. Then, as now, the need for public health programs crystallized this issue. The history of what happened then is well known to the members of this Association. The question that confronts psychiatrists is, "Do we want to maintain the leadership and direction in the great and rapidly increasing field of mental hygiene?" If we do not accept this larger responsibility, a new profession will develop. It is not the social worker who is unwilling to wait for us to decide, but rather the public at large.

We are today confronted with a new set of conditions that force the psychiatrist to face this issue and to decide either to extend his help in the direction of social and community issues or to remain cloistered in older confines. The enactment of a number of laws encouraging the extension of material elements, buildings and equipment—encourage his sequestration; the enactment of other laws having to do with the security of people, especially the Social Security Act, opens the door for him. The administration of this Act, which is a functional provision, will demand many decisions as to the extent of psychiatric service, standards of such service in communities and possibilities of consultation. These require of the psychiatrist more than a willingness to cooperate; they require that he orient himself in social psychiatry and even more in the functions and processes of the various agencies with which he will cooperate. These federal laws and their local counterparts should be studied carefully by members of this Association and preparation made to meet their implications. It is to take care of requests for advice from official authorities in this situation that this committee strongly recommends to this Association: (1) that a committee with authority to speak for the Association shall be created as advisers available to act officially in such matters; (2) through giving all its support to the development of satisfactory standards of social work and the opportunity for the training of social workers, its members take the lead in the establishment of an effectual and standardized curriculum of psychiatric social work training; (3) for this purpose the committee shall actively participate in any joint effort, *e. g.*, by the establishing of a joint committee with the American Association of Schools of social work, to set up such standards of training and provide opportunity for field training in institutions and clinics under the control of the members of this Association.

At the present juncture it is probable that many members of the Association will be consulted individually and collectively with regard to community psychiatric activities. This committee will be glad to advise such members so consulted when the members feel they would find such advice useful. It believes it will be well to have this fact brought to the attention of the

general membership by means of an editorial in the JOURNAL of The American Psychiatric Association.

SAMUEL W. HARTWILL, M. D., *Chairman*,
EARLE W. FULLER, M. D.,
MESROP A. TARUMIANZ, M. D.,
GEORGE S. STEVENSON, M. D.,
HENRY I. KLOPP, M. D.

REPORT OF THE CHAIRMAN OF THE COMMITTEE ON RESEARCH.

There has been no formal meeting of the committee during the current year, but the chairman has been in correspondence with individual members. One of the members (Dr. L. E. Hinsie) has considered the responsibilities of the Committee on Research, and suggests the following: (1) "to act as advisers on anticipated research problems"; (2) "to suggest topics for research"; (3) "to read manuscripts critically"; (4) "to indicate what funds or endowments might be available." These topics are discussed in detail in his letter which is appended to this report.

A former member of the committee (Dr. Gregory Zilboorg) has offered a fruitful suggestion: "of developing, through the research committee, a focus of interest in the history and development of psychiatric concepts." The chairman has long felt the lack of a convenient source of such information; moreover, such a center of interest would be useful to the younger psychiatrists in particular, many of whom fail to realize how much we owe to our antekraepelinian predecessors, and conversely, how far we have come in what will soon be a century of organized American psychiatry. It is perhaps not too soon to be looking forward to a survey of the latter aspect of the subject for the centenary (1944) of the Association.

The chairman has completed a list of articles published by Fellows and Members and indexed in Vols. 17, 18 and 19 of the "Quarterly Cumulative Index Medicus." He has grouped the members geographically in regions of approximately the same membership, so as to compare the relative "literary" output; also affiliation or non-affiliation with hospitals has been taken into account. The original articles have been classified under 15 general heads. This material, and in addition population statistics, has been embodied in a table which is attached as a supplement to this report. This table has been of interest, and possibly of some use, to the Mental Hospital Survey Committee, with whose work our Association is cooperating.

The chairman wishes to call attention to the work of a member of the committee (Dr. Walter L. Bruetsch) who has continued to devote a great deal of time and attention to organizing the annual scientific exhibits, as well as presenting a large amount of pathological material of his own. The chairman would also like to signalize the book recently published by Dr. Nolan D. C. Lewis (in connection with projects subsidized by the Scottish Rite Masons of the Northern Jurisdiction) on "Research in Dementia Præcox." This book will answer many questions which might otherwise be addressed

to the committee. It would be desirable if such a study could be extended to the whole field of psychiatry.

Finally, there is a good chance that the National Research Council, through one or more of its committees, may, in the near future, take a more direct interest in promoting experimental research into the etiology of abnormal behavior reactions. The chairman, who is ex-officio a member of the Medical Division of National Research Council, is not in a position to give any further details at this time. In other respects the National Research Council is continuing lines of research outlined in previous reports.

Respectfully submitted,
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JOHN C. WHITEHORN, M. D.,
E. L. HORGER, M. D.,
WALTER L. BRUETSCH, M. D.,
LELAND E. HINSIE, M. D.

REPORT OF THE COMMITTEE ON RESOLUTIONS.

The Committee on Resolutions presents the following report:

We wish first of all to express our best appreciation to the Committee on Arrangements, under the able chairmanship of Dr. Frederick, for the admirable manner in which it planned for the pleasure and profit of those attending this convention, the success of which has been so largely due to its efforts, and to the Ladies Committee which so ably assisted it.

To the President, Dr. Campbell, to the Secretary, Dr. Sandy, to the Council and to the Committees we have only praise for the very efficient manner in which they have performed their duties. The Presidential address of Dr. Campbell leaves us permanently indebted to him. We are also grateful to the Guest of Honor at the Annual Banquet, Dr. John Gabbert Bowman, Chancellor of the University of Pittsburgh, for his remarkably inspiring address.

To all those who contributed papers at the various sessions we owe a real debt of gratitude. The papers were uniformly of high excellence, reflecting keen scientific knowledge, interest, energy and ability, and we have all benefited from these presentations. The arduous task of preparing the program for the various sessions and sections has been ably performed by the Committee on Program. We feel this Committee is to be commended for the excellence of its work and our particular congratulations are extended to its very efficient chairman, Dr. Roscoe W. Hall.

The thanks of the Association are also extended to Dr. Walter Bruetsch for his splendid arrangement of the scientific exhibits, and to those who prepared such exhibits and motion picture presentations for the edification of the convention. The commercial exhibitors are, of course, also included in this appreciation.

The press is to be particularly commended for the restrained yet thorough manner in which it has disseminated for the benefit of the public, those matters of great scientific and public interest which have been discussed in our meet-

ings and in which it has been ably assisted by the Committee on Public Education under the capable chairmanship of Dr. C. C. Burlingame.

To the hotel management and Convention Bureau for their fine cooperation, to Miss Crowe, our official reporter, for her excellent work, to the Kaufmann Company, the Heinz Company, the St. Francis Hospital for their entertainment, and to all others who have had any part in helping to make this convention so thoroughly successful, we extend the grateful thanks of the Association.

GEORGE H. STEVENSON, M. D., *Chairman,*
FRANK E. LESLIE, M. D.,
TITUS H. HARRIS, M. D.

Comment.

GOVERNMENTAL POLICIES IN NEW YORK AND MASSACHUSETTS.

It is an arresting coincidence and an enlightening illustration of opposite governmental policies in the administration of state mental hospital services that within a twelvemonth appointments to the headship of these services should have been made in two great States which had hitherto gone hand in hand in the van of every advance movement in dealing with the vital social problem of the care of the mentally ill.

The march to the rear of former Governor Curley of Massachusetts has been dealt with in previous editorial comments in the JOURNAL. By the displacement of Dr. Winfred Overholser as commissioner of the Department of Mental Diseases, Massachusetts lost the services of one of its most valuable officers. It is gratifying to note that the federal government has been quick to take advantage of the situation by appointing Dr. Overholser to the superintendency of St. Elizabeths Hospital in Washington.

Hard upon the unfortunate happenings in Massachusetts comes the retirement of Dr. Frederick W. Parsons, commissioner of the Department of Mental Hygiene of the State of New York, but with what contrast of circumstance. Governor Lehman expressed his great regret that in respecting the wishes of Dr. Parsons he must accept his resignation. In his letter to the commissioner he paid high tribute to his splendid service of thirty-five years.

> During this long period you have served the state with unusual fidelity, devotion and efficiency. On behalf of the people of the State may I thank you very heartily for your splendid service.
>
> I want you to know that my association with you, both as Lieutenant-Governor and Governor, has been a most happy one and that I shall very greatly miss your loyal assistance and wise counsel.

In such manner the Governor of New York expressed appreciation of the work of a faithful servant.

At the same time in the appointment of the new commissioner, Dr. William J. Tiffany, Governor Lehman voiced his satisfaction that he was able to promote a trained and trusted official who had come up from the ranks, one who has had long experience in all phases of clinical and administrative psychiatry and who enjoys in such large measure the respect and confidence of his colleagues. Under Dr. Tiffany's guidance the department built up by Dr. Parsons may be expected to flourish.

Massachusetts and New York—the contrast is exemplified in the two comments which follow.

DR. OVERHOLSER BECOMES SUPERINTENDENT OF ST. ELIZABETH'S HOSPITAL.

The appointment by President Roosevelt of Dr. Winfred Overholser, of Wellesley, Massachusetts, as superintendent of St. Elizabeth's Hospital to fill the vacancy caused by the death of Dr. William A. White is gratifying to psychiatrists who are familiar with the situation. Dr. Overholser assumed the duties of his new post on October 4, 1937.

On December 4, 1936, Dr. Overholser, after 17 years of outstanding service to the state hospitals in Massachusetts, was replaced as Commissioner of the Department of Mental Diseases by the then Governor of Massachusetts. This political stroke was followed by a succession of blows to the Department of Mental Diseases and the state hospitals of Massachusetts and the loss of Dr. Overholser has been felt keenly in his native state. This loss by the Commonwealth of Massachusetts has been converted into a gain for St. Elizabeth's Hospital by rendering available a man of this caliber to succeed the late William A. White, who won recognition as dean of hospital psychiatry in America.

Dr. Overholser's training and teaching experience as professor of psychiatry at Boston University, School of Medicine, and lecturer, Boston University, School of Law, preeminently qualify him for the teaching assignments which are associated with the appointment. Dr. Overholser is a recognized authority on forensic psychiatry and his publications are widely known to psychiatrists and to all who are interested in medical jurisprudence.

He was born in Worcester, Massachusetts, April 21, 1892; was educated in the public schools of Wellesley, Massachusetts; received his A. B. degree, *cum laude,* from Harvard College in 1912, and his M. D. degree from Boston University, School of Medicine, in 1916. After a residency of one year at the Evans Memorial Hospital in Boston, he entered the state service as assistant physician at Westborough State Hospital in 1917. His professional career was devoted to the state hospitals of Massachusetts except for a period of one year, 1918-1919, when he was a lieutenant, Neuropsychiatric Section of the U. S. Army Medical Corps and served overseas.

His progressive and consistent promotions from assistant physician to Commissioner of the Department of Mental Diseases, with a succession of experiences in clinical and administrative psychiatry, presaged the high honor which has been accorded him by the St. Elizabeth's appointment.

Dr. Overholser was president of the Massachusetts Psychiatric Society, 1933-1934, and president of the New England Society of Psychiatry, 1936-1937; is councillor and member of the Executive Committee of The American Psychiatric Association; member of the Executive Committee of the Cooperative Committee for the National Survey of Public Mental Hospitals Services in the United States; member of the Committee on Post-Graduate Instruction of the Massachusetts Medical Society; chairman of the Committee on Legal Aspects of Psychiatry of The American Psychiatric Association; member of the Committee on Psychiatric Jurisprudence of the American Medical Association; member of the Committee on Scientific Administration of the National Committee for Mental Hygiene, and consultant in psychiatry in the U. S. Public Health Service. He was formerly consultant in the medical aspects of crime of the National Crime Commission; secretary of the Massachusetts Chapter of the American Institute of Criminal Law and Criminology; member of the Executive Committee of the Massachusetts State Conference of Social Work; chairman of the Committee on Delinquency and Prisons, First International Conference on Mental Hygiene; Chairman of the Hospitalization Committee of the Department of Massachusetts of the American Legion. Recently, he has been actively engaged in surveying mental hos-

pitals in the United States and Canada as director of the National Hospital Research Division of the National Committee for Mental Hygiene.

Always interested in medical progress and research, Dr. Overholser's unique training and experience, together with his stimulating and sympathetic personality, offer St. Elizabeth's Hospital fortunate compensation for its recent loss. Dr. Overholser's popularity in medical organizations and in fraternal circles has parallelled his leadership in his chosen field. He was married June 4, 1919, to Dorothy Stebbins of Worcester, Massachusetts; they have three children, Dorothy, Jane, and Winfred, Jr.

RETIREMENT OF COMMISSIONER FREDERICK W. PARSONS AND APPOINTMENT OF DR. WILLIAM J. TIFFANY.

Dr. Frederick W. Parsons, Commissioner of the Department of Mental Hygiene of New York State since January 1927, retires from the Department on October 1. In Dr. Parsons' place Governor Lehman has appointed Dr. William J. Tiffany, superintendent of the Pilgrim State Hospital.

Dr. Parsons entered the New York State Hospital Service in 1902 when he was appointed to the staff of the Hudson River State Hospital, Poughkeepsie, New York. While there he reached the grade of first assistant physician in which position he served for six years until he enlisted in the Medical Corps of the United States Army in June 1917. He was first assigned to the British Forces, studying cases of war neuroses under Sir Frederick W. Mott of London. After the United States entered the war, he was transferred to the American Forces and became commanding officer of Base Hospital No. 117 where he served with efficiency and distinction and achieved the rank of lieutenant-colonel. Following his discharge from the Army, Dr. Parsons acted for a short time as medical inspector of the State Hospital Commission, and in April 1919 was appointed superintendent of the Buffalo State Hospital. On July 1, 1926, he was appointed by Governor Smith member and chairman of the New York State Hospital Commission to succeed Dr. C. Floyd Haviland. When in January 1927

the reorganization of the State Departments became effective and the former State Hospital Commission became the Department of Mental Hygiene, Dr. Parsons was appointed by Governor Smith as Commissioner of the Department. Because of the provision in the amended State Constitution that heads of departments were to be appointed by the Governor and their terms were to be coterminous with his own, there was considerable doubt in the minds of some persons as to whether such an arrangement with its potential uncertainty of tenure of office would be best for the operation, particularly of the Department of Mental Hygiene, and whether it would attract the best type of physician to head such a Department. The last ten years have dispelled doubts of this nature. Dr. Parsons has continued in office by reappointment by Governors Roosevelt and Lehman and the Department of Mental Hygiene has been recognized as one of the best organized and operated of the several State Departments.

The state has been fortunate in having governors with vision to recognize the ability of Dr. Parsons, and the state has likewise been fortunate in having a commissioner such as Dr. Parsons willing to serve as the head of a Department which has the responsibility of administration of twenty-six large institutions for the mentally ill and the mentally defective. During Dr. Parsons' administration an extensive building program has been carried out including the construction of several large new hospitals and additions to those already existing. At all times he received the wholehearted and deserved cooperation of the superintendents and Boards of Visitors of the state institutions. Dr. Parsons has not only been an able administrator but his sympathy for, and interest in, research was continuously demonstrated by his encouragement and support of the activities of the Psychiatric Institute and Hospital and by the more recent establishment of the treatment of dementia præcox by means of insulin in all the state hospitals. Psychiatry in this country can well be proud of having such an outstanding exponent of sound principles of hospital administration for the care of the mentally ill.

New York State continues to be fortunate in having as Dr. Parsons' successor Dr. Tiffany, who has had an experience of over thirty years in the State hospital system of New York and

who during this time has evidenced such outstanding ability as to raise no question that the Department of Mental Hygiene will remain in good hands.

Dr. Tiffany began his service at the Binghamton State Hospital in 1904 and had associations there with Dr. William A. White, Dr. Charles G. Wagner and Dr. James V. May, all former presidents of The American Psychiatric Association. For a number of years Dr. Tiffany was pathologist at the Binghamton State Hospital and later held that position at the Manhattan State Hospital. He was appointed clinical director of the Kings Park State Hospital in 1922 and became superintendent there in 1926. When the new Pilgrim State Hospital, which was contemplated as the largest of its kind in the world, was under construction and organization, Dr. Tiffany was selected by Dr. Parsons as the one best suited to carry on the difficult tasks of that development, and Dr. Tiffany was appointed as superintendent of the Pilgrim State Hospital in 1931. He has shown during the past six years the ability to meet and solve problems that would be to many insurmountable. Through his natural qualifications and training Dr. Tiffany has an unusual combination of resources in fields of hospital construction and administration, treatment and research; and it may be safely anticipated that the New York State Department of Mental Hygiene under Dr. Tiffany will continue the progress that it has shown in the past ten years, and demonstrate anew the importance of having a man at its head who has reached his position because of training and experience and not through political expediency.

C. O. C.

News and Notes.

94TH ANNUAL MEETING.—The annual meeting of the Association will be held in San Francisco, June 6-10, 1938, with headquarters at the Fairmont Hotel. This meeting is especially noteworthy as it is the first time that the Association has gone to the Pacific coast to hold its annual session; and it is anticipated that this fact will bring a large attendance of members who will be glad to avail themselves of the opportunity of combining with the regular annual meeting a visit to San Francisco and the West.

To this end special all expense tours have been arranged, notices of which have been sent to members from the New York office by Mr. Austin M. Davies, executive assistant, to whom inquiries for further information may be addressed.

ANNUAL MEETING, AMERICAN MEDICAL ASSOCIATION.—The 1938 annual sessions of the American Medical Association will be held in San Francisco, June 13 to 17. These meetings follow directly upon The American Psychiatric Association save for the week-end interval.

Members who wish to attend the meetings of the American Medical Association are informed that if they wish an extension of their hotel accommodation it will be necessary to arrange for this with the Hotel and Housing Committee of the American Medical Association, Suite 2004, 450 Sutter St., San Francisco, California. Space in all hotels is being reserved by the Americal Medical Association beginning at noon June 10, 1938, which is the final day of The American Psychiatric Association meeting.

SCIENTIFIC EXHIBIT AT THE ANNUAL MEETING IN SAN FRANCISCO IN 1938.—There will be a scientific exhibit at the next annual meeting of The American Psychiatric Association. The following topics for the purpose of general orientation are suggested: interesting material relating to neuropathology, neuroanatomy,

new laboratory procedures, clinical psychiatry, mental hygiene, child guidance, diagnostic methods, statistical researches, etc.

Important aids toward a successful scientific exhibit are personal demonstration; plainly lettered posters; statement of purposes or justification of exhibit; and neatness and care in planning material. The scientific exhibit offers an opportunity for investigators and visiting members to meet and discuss informally the various phases of the research work presented. The exhibit is also of special advantage to persons reading papers since the exhibit can be used to supplement the papers read. Application for space with a short description of the exhibit material, not exceeding 150 words, should be submitted to the Director of the Scientific Exhibit, Dr. Walter L. Bruetsch, Central State Hospital, Indianapolis, Indiana, not later than March 1, 1938.

Medical Society of St. Elizabeth's Hospital (Washington, D. C.).—This Society was recently organized in Washington by a number of present and former members of the medical staff of St. Elizabeth's Hospital. It is planned as an alumni society of the hospital, to include physicians now serving, or having served in the past, on the hospital staff. In general, it will sponsor and support efforts to promote the best interests of the hospital and will serve to maintain among its members pleasant associations with the hospital and with each other. The encouragement of a program of guided psychiatric research at the hospital is a contemplated feature of the work of the Society.

Officers elected at the initial meeting are: Dr. Addison M. Duval, president; Dr. Joseph L. Gilbert, vice-president; Dr. Jay L. Hoffman, secretary.

Communications from former staff members (including medical officers in the military services who have been assigned to the hospital) are invited and should be addressed to the Secretary, Medical Society of St. Elizabeth's Hospital, St. Elizabeth's Hospital, Washington, D. C.

Fellowship Opportunities.—A limited number of fellowships have been provided by The Commonwealth Fund and other sources

for training in extramural psychiatry. These fellowships are to be administered by The National Committee for Mental Hygiene, through whom fellows are to be assigned for one or two years to a selected child guidance clinic, the term and plan of the fellowship to be determined by the peculiar needs of the fellows. Candidates for fellowship award should have had at least two years of psychiatry in an approved mental hospital service, in addition to other qualities fitting them for extramural work. This provision of training fellowships comes in response to a definite paucity of personnel in this field. Accordingly, other conditions as to age, sex, marital status, etc., must be governed by individual cases and by the nature of current demand. Requests for further information about these fellowships, and applications therefor, should be addressed to Dr. George S. Stevenson, The National Committee for Mental Hygiene, Room 822, 50 West 50th Street, New York, N. Y.

FELLOWSHIP APPOINTMENTS, 1937-1938.—Under a grant from The Commonwealth Fund, the National Committee for Mental Hygiene has made the following appointments for one year's training in extramural psychiatry:

At the Judge Baker Guidance Center, Boston, Dr. Reynold A. Jensen, a graduate of University of Minnesota Medical School, with one year each at the Psychiatric Department of Strong Memorial Hospital, Rochester, and the Pennsylvania Hospital in Philadelphia.

At the Louisville Mental Hygiene Clinic, Dr. Edward Everett Landis, who obtained his medical degree from Northwestern University and comes to this fellowship from the Fulton State Hospital in Missouri.

Dr. Joseph C. E. LaVallee to the Child Guidance Clinic in Cleveland. Dr. LaVallee obtained his medical education at Syracuse University in 1926 and has recently been resident psychiatrist at the Buffalo City Hospital.

Dr. Robert Penn Kemble to the Philadelphia Child Guidance Clinic. Dr. Kemble is a graduate of Jefferson Medical College, 1933, and served a residency at the Pennsylvania Hospital and the Payne Whitney Clinic, New York Hospital.

GRADUATE CLINIC AT RALEIGH, NORTH CAROLINA STATE HOSPITAL.—Dr. Julian W. Ashby, superintendent of State Hospital, Dix Hill, Raleigh, N. C., by arrangement with the New York State Psychiatric Institute, provided a two weeks graduate clinic at the Raleigh State Hospital, August 1-14, 1937.

This clinic was conducted by Dr. Joseph R. Blalock of the New York State Psychiatric Institute, and included some of the features of the two weeks graduate course given each autumn at the New York State Psychiatric Institute. The program consisted of lectures on the biogenetic psychoses, the psychoneuroses and psychosomatic relations; clinical conferences in which cases were presented by members of the staff; presentation by the staff of reviews of selected publications; and ward rounds in which special attention was given to the problem of insulin therapy and the treatment of neurosyphilis.

MISSISSIPPI VALLEY MEDICAL SOCIETY AWARD.—The Mississippi Valley Medical Society (Tri-State Post-Graduate Assembly of Illinois, Missouri, and Iowa), offers a cash prize of $100.00, a gold medal and a certificate of award for the best unpublished essay on a subject of interest and practical value to the general practitioner of medicine. Entrants must be ethical licensed physicians, residents of the United States and graduates of approved medical schools. The winner will be invited to present his contribution before the next annual meeting of the Mississippi Valley Medical Society (September 28, 29, 30, 1938), the Society reserving the exclusive right to first publish the essay in its official publication—the Radiologic Review and Mississippi Valley Medical Journal. All contributions shall not exceed 5000 words, be typewritten in English in manuscript form, submitted in five copies, and must be received not later than May 15, 1938. Further details may be secured from Harold Swanberg, M. D., Secretary, Mississippi Valley Medical Society, 209-224 W. C. U. Building, Quincy, Ill.

CIVIL SERVICE EXAMINATIONS.—The United States Civil Service Commission announces open competitive examinations for the following positions:

Junior medical officer (rotating interneship), $2000 a year.
Junior medical officer (psychiatric resident), $2000 a year.

The place of employment is to be St. Elizabeths Hospital, Washington, D. C. Applications for these positions must be on file with the U. S. Civil Service Commission, Washington, D. C., not later than November 29, 1937, if received from states east of Colorado, and December 2, 1937, if received from Colorado and states westward.

For the position of junior medical officer (rotating interneship) applicants must be fourth-year students in a grade A medical school. For the position of junior medical officer (psychiatric resident) applicants must have successfully completed four years of study in a grade A medical school not prior to January 1, 1935, and must have the degree of either B. M. or M. D. In addition they must have successfully completed an interneship of at least one year, provided that applications will be accepted from persons now serving an accredited rotating interneship.

Full information regarding these examinations may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city which has a post office of the first or second class, or from the United States Civil Service Commission, Washington, D. C.

Book Reviews.

PERSONALITY AND THE CULTURAL PATTERN. By *James S. Plant, M.D.* (New York: The Commonwealth Fund; London: Humphrey Milford, Oxford University Press, 1937.)

The central theme of this book is that the personality is in large measure the result of the cultural pattern in which the individual lives. The task of psychiatry and mental hygiene is thus not alone to deal with the individual but to concern itself also with alteration of the cultural pattern. In such alterations, human institutions must be evaluated in the light of what they mean to individual men, women, and children.

The author distrusts, possibly too much, mere statistical or questionnaire approaches to the study of the relationship of the individual and the social institution. One proposal which he makes for the better understanding of this relationship is what he terms the "casual breakdown." This term is used to describe a situation in which the individual finds himself in a short and dramatic dislocation with a given social institution. Thus the first overt truancy illuminates the question "What does school mean to me?" The slammed door of the husband, "never to return," appraises certain things that marriage has meant to that man. The author emphasizes the point that there are certain to be artifacts in material collected in connection with such dramatic incidents, but if a sufficient number of cases are collected, he believes the method will contribute much to an understanding of the individual-institution relationship.

From the standpoint so established, the author discusses the concepts of classical psychiatry and the structure of the personality in relation to environmental pressures. The part of the family, the school, recreation, law and order, social work, medicine, the church, and industry are all considered in this connection.

This book contains much information and many arresting suggestions. One who tries to read it, however, in an objective mood cannot help feeling that the author has possibly even too well integrated in its pages his own value judgments concerning present-day social institutions and his factual observations. For example, he says "The schools have been interested to know how large an amount of academic knowledge could be given to children. The really more pressing question is how little of it will permit the individual to live comfortably with others at his chosen level and will also meet the demands of the welfare of the group." Surely there are still valid arguments in favor of the older conception of education here dismissed. In the author's conclusions on this and other social questions, the reader may well

remember that the author's evaluations are based upon a certain philosophy of social psychiatry and that therefore another social philosophy might well lead to different and sometimes even opposed value judgments.

LEONARD CARMICHAEL, PH. D.,
University of Rochester.

MODERN DISCOVERIES IN MEDICAL PSYCHOLOGY. By *Clifford Allen, M. D., M. R. C. P., D. P. M.* (London and New York: Macmillan and Company, Ltd., 1937.)

The author of this book says that "it is hoped that it may interest the general practitioner, the medical student and even form an introduction for those who intend to read for the Examination for the Diploma of Psychological Medicine." As used in this book, the term *modern* is "taken to include the last 40 years," but it seems to the reviewer that the emphasis is given to the first rather than to the second 20 years of this period.

Unlike most scientific works this volume has a plot. It begins in a discussion of the work of Mesmer and his followers in hypnotism. It shows how, in the author's opinion, this point of view led to the positions of Janet, Morton Prince, and their associates. Thus the way was prepared for the "discovery of psychoanalysis" by Freud. This discovery was essentially that "the real cause of the patient's illness was locked away deep down in his unconscious mind. But more than this, *he* (Freud) *knew how to rescue the idea from the depths of oblivion.*" The discussion of Freud is eulogistic. The reader is told, "Now, it must be admitted that the enemies of Freud must be careful not to admit any single part of his discoveries to be valid, since one part is interlocked with the other part, and if one admits that one thing is correct, one is forced to admit the validity of the whole edifice. . . . . If one once admits that Anna, Freud's little daughter, dreamed of tasty food because she had had no food all day on account of a bilious attack—that she wished for tasty food, and this caused the dream, then one must admit that all dreams are due to wishes. At this stage one is gained as an adherent to Freud forever." Again, the reader is told that "There is one branch of psychological medicine which is the direct offshoot from Freud's work and which has not been touched on before, and that is child analysis and child guidance. It is on this that great emphasis has recently been laid. The most surprising thing in the world is the way in which young children will respond to a change of environment and a little assistance over their emotional difficulties. If only all children could be observed when they were in the process of forming a neurosis and treated at once, it would be safe to say that the incidence of this type of illness would be reduced enormously." One is tempted to ask if a change of environment and a little assistance over emotional difficulties necessarily constitute a direct offshoot from Freud's work.

Following the chapter on Freud, there are chapters giving clear pictures of the contributions made by Adler and Jung to medical psychology. Both of these chapters are, nevertheless, written from a distinctly Freudian point

of view. Then there follow in the book, surprisingly enough, chapters on Kretschmer and Pavlov. Kretschmer's type-theory is described in a rather favorable way. It is true, however, that without further explanation, the statement is made that "Kretschmer's work had been severely criticised in America, and we must be cautious in accepting it in an uncritical way."

The final chapter on Pavlov is an informative brief summary of the work of this investigator. The chapter does not, however, give any clear indication of the vast amount of work on conditioning done both in Russia and America by scientists other than Pavlov. Brief mention is made of behaviorism, "elaborated by John B. Watson in America," but no discussion is presented of the large amount of quantitative work which has grown out of, and which indeed in some measure preceded, Watson's objective experiments on emotional and other types of learning in children.

The first paragraphs of this book give faint praise indeed to academic psychology before turning to the "discoveries" of abnormal psychology. Unfortunately, however, the present volume gives very little consideration to the respectable body of fact accumulated by the academic experimental psychology of our day. It is true Dr. Allen cites C. L. Hull's book, *Hypnosis and Suggestibility: An Experimental Approach,* but he gives the author's name a wrong initial and certainly in no way suggests interest in the quantitative facts which have come out of laboratories of experimental psychology concerning the phenomena of hypnosis and which are summarized in Hull's book.

Dr. Allen unfavorably criticizes the wordiness of academic psychology, but in his own work, he employs such words as "mind," "consciousness," "psychical energy," "the unconscious," and the like without making clear the definitions which he accepts.

In the last chapter, the author expresses himself as sympathetic to an approach toward an understanding of mental processes by the study of the behavior of the human organism and the physiology of the nervous system. Here is a rigid determinism to contrast with the essential vitalism of the libido theories discussed in much of the book. In spite of this possible fundamental difference, Dr. Allen says "Pavlov's work does tend to throw a great deal of light on the work of Freud, and their theories are not really mutually incompatible. . . . . We cannot help agreeing that his work is even more fundamental than Freud's, and that eventually it may lead to something of great value." With this point of view, the reviewer finds himself in complete accord. Almost 30 years ago, E. B. Holt began the process of showing how certain of Freud's undoubted insights could be synthesized into a modern physiological psychology of behavior. The large literature which has developed out of this standpoint and the experiments upon which this point of view is based are not discussed in the present work. To compare the latter with such a volume as L. S. Shaffer's recent *Psychology of Adjustment* is to make this point clear.

Freudian psychoanalysis is well reviewed in this book, but, save for this material, it can scarcely be said to deal with modern psychology, at least

as the term is understood in America today. The "discoveries," moreover, which are emphasized in the book, such as that of "the unconscious," are not discoveries as that word is used in physical science. The concept of the unconscious still remains a theory, and one is tempted to remember the phrase of one of America's well known psychologists who suggested that at best, a theory is an individual's more or less blundering effort to organize the facts of observation. In the case of medical psychology, the data of observation are the objective facts of what human beings do and say and the demonstrated neural and physiological basis of such actions. From this point of view, a discussion of modern discoveries in medical psychology involves summarizing the recent advances in half a dozen medical sciences, not a mere re-telling of the story of psychoanalysis.

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AN INTRODUCTION TO ABNORMAL PSYCHOLOGY. Revised Edition. By *V. E. Fisher*. (New York: The Macmillan Company, 1937.)

This is the second edition of a textbook of abnormal psychology intended for college undergraduates who have had one previous course in general psychology.

The chapter headings give some idea of the scope of the book: 1. Abnormal Psychology; 2. The Normal Personality; 3. Personality Variants and Their Measurement; 4. Criteria of Personality Adjustment; 5, 6, 7, 8. Common Modes of Reaction to Difficulties; 9, 10, 11, 12, 13. The Psychoneuroses; 14. Some Borderline Conditions; 15, 16, 17. The Functional Psychoses; 18. Some Organic Psychoses; 19. Sleeping; 20. Dreaming; 21. Hypnotism and Suggestion; 22. The Feebleminded Individual; 23. A Word on Mental Hygiene.

A number of cases are cited in the book which well serve to illustrate the subject matter of the respective chapters.

The general standpoint from which this book is written raises a fundamental question as to the relationship between abnormal psychology and psychiatry. The reviewer tends to think of general psychology and abnormal psychology in their relation to medicine as strictly pre-clinical. If this distinction is a valid one, this book is both psychology and psychiatry. A combination work of this sort may well be of less value to those who expect later, as medical students, to have adequate instruction in psychiatry than would be a more strictly psychological book. It may well be, however, that a combination treatment of this sort may prove very useful to the future nurses, teachers, ministers, social workers, lawyers, and citizens who happen to study "abnormal psychology" in an undergraduate college and who never expect to receive any other systematic instruction in the abnormalities of mental life.

LEONARD CARMICHAEL, PH. D.,
University of Rochester.

SUBSTITUTE PARENTS: A STUDY OF FOSTER FAMILIES. By *Mary Buell Sayles.* (New York: The Commonwealth Fund, 1936.)

A book dealing with the constructive aspects of foster family problems comes as a welcome contrast to the many reports in the literature which stress the unfavorable influences resulting from this relationship. In the present short volume, written for the general reader, the author gives an intimate picture of successful foster homes which were drawn into the service of child placement agencies.

The first part of the book, consisting of 70 pages, presents a concise general discussion of the problems inherent in foster family relationships, the motives which lead people to seek the experience of foster parenthood, and the information concerning both child and prospective home which is a necessary prerequisite to adoption. The author discusses both the constructive and destructive forces which must be reckoned with by women and men who essay to play the rôle of substitute parents. The material in these introductory chapters is presented in a practical, matter-of-fact way, reflecting the experience of the trained social worker who understands foster children and their setting from the standpoint of mental hygiene.

The second and larger portion of the book, 133 pages, contains eight chapters, each a detailed case study of individual children and their foster parents. These reports are written in an informal, narrative form, giving a factual sociologic account of the vicissitudes of child placement, the constantly changing developments, and the indispensability of follow-up supervision. In all instances there were more than the usual number of handicapping factors, yet through the selection of wise and capable foster parents each case was carried well on the way to a successful solution.

This work can be recommended as a helpful sociologic report of the constructive and encouraging aspects of guided foster family relationships, and is one that can safely be placed in the hands of intelligent adults who are desirous of adopting a child.

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STUDIEN ÜBER DIE ENTWICKLUNG DER INTELLIGENZ BEI FRÜHGEBORENEN KINDERN. By *Torild Brander.* (Helsingfors: Akademische Buchandlung. Berlin: R. Friedländer and Sohn, 1936.)

The present book is in line with the recent tendency for a reorientation in the field of psychiatry and neurology, a tendency which emphasizes the importance of the study of the prenatal influences. In this volume only one problem is considered, namely, the relationship between premature birth and the development of intelligence. The study was carried out under the auspices of the Pippingskold Research Fund and the Finnish Scientific Society. In an introductory chapter Brander discusses the concept of premature birth from the obstetrical and pediatric standpoints. He considers the weight of 2,500 grams or less as a criterion for premature birth. He gives an interest-

ing historical review of the subject; it seems that Shakespeare was the first to point out in a monologue of King Richard III, the relationship between intracranial involvement and premature birth. King Richard III was prematurely born and Shakespeare's description of his physical condition would suggest the possibility of Little's disease. Of more scientific importance is the first communication on this subject made by Ritter in 1849, in which he reported a case of a 16 year old idiot born during the sixth month of pregnancy. Later, in 1862, the English orthopedist Little drew attention to this relationship. During the following years considerable disagreement prevailed among the various investigators, which Brander ascribes to such factors as heterogeneous nature of the material, failure to utilize the material to the fullest extent, difficulty in gauging the degree of intelligence defect at an early age and lack of uniform working criteria.

In order to obtain a clearer idea as to what happens to the prematurely born children Brander went over the records of the obstetrical hospital in Helsingfors from 1919 to 1927 inclusive. He found that there were 2310 premature births in a total of 18,073 births. The prematurely born children weighed from 600 to 2500 grams. Of these 1240 died at birth or shortly afterwards, while 1070 were sent home. Five hundred and eighty-three were still living when Brander undertook his investigation. Most of these children were between 7 and 15 years of age at that time. Brander examined 365 children personally; 153 children who were living in the provinces were seen by the local physicians; the rest failed to appear for examination. The Binet-Simon-Terman test was used. Most of the children attended the public school at that time. Because of the size of the group and the systematic methods used it may not be amiss to present here some of the findings obtained by Brander. He found that the later the children learned to walk the lower were their average and the high I. Q. values. He established a similar relationship in regard to speech. He also found that the average, the high and the low I. Q. values increased *pari passu* with the child's progress in school. The same was also true of children in high school. Of the entire group, 46 per cent of the children showed normal intelligence rating, 1.4 per cent were of the borderline type, while the remaining 52.7 per cent had a low intelligence level. Of the entire group 11.2 per cent belonged to the imbecile group. Brander claims to have found a distinct relationship between the I. Q. and the weight of the child at birth; children weighing below 1500 grams at birth constituted the low intelligence group, while normal intelligence ratings were found in children with weight at birth of 1510 grams and more, and finally high intelligence was observed in children with 2110 grams and more. With the help of a standard curve Brander attempted to show that the relationship between the weight deficit and intelligence unit amounts to 500 grams for every seven or eight I. Q. units.

Of the other facts, which, according to Brander, seem to have an unfavorable influence on the intelligence are psychic hereditary taints. However, he found among 42 instances of mental defect only 3 cases in which the hereditary element played a predominant factor. Epilepsy and various psychoses, except of luetic origin, in the ascendency played even a smaller rôle. On the

other hand, he found a definite relationship between alcoholic heredity and mental defect in prematurely born children. The triad of premature birth, delivery complications and psychic heredity has proven to be the most unfavorable combination with an incidence of mental defect in 35 per cent of the cases. In the absence of hereditary factors the percentage of mental defect in cases with birth complication in prematurely born children is higher than in uncomplicated deliveries. He believes that the danger is particularly great in cases with face presentation, in breech presentation, in precipitated delivery and delivery with high forceps and in extraction in breech presentation. He thinks that in eclampsia, in prolapse of small parts and in asphyxia the mental development will depend upon the immediate therapeutic intervention.

In another chapter he discusses the problem of twins. Here he pays attention to the mechanical element and to the fact that twins are frequently prematurely born. Children, out of wedlock, born prematurely are, according to the author, of a lower intelligence level as compared with legitimate offsprings. Brander thinks that this may be due in part to the lower social standing of the progenitors. He noticed that primogene children of older primparæ compare unfavorably with children born later.

Calculating that 12.8 per cent of all births during the period from 1919 to 1927 which took place in the maternity wards of Helsingfors University Hospital were premature, and that 25.2 to 35.9 per cent of these children survived to reach the school age, he therefore concludes that 3.2 to 4.6 per cent of the children in public schools of Helsingfors were prematurely born. Reasoning further that since 11.2 per cent of this group are mentally deficient, ½ per cent of all the children are therefore probably mentally defective because of premature birth. He further states that there is probably a direct relationship to premature birth in 12.5 to 25 per cent of all hypophrenias. He found relatively few cases with endogenous hereditary factors, such as mongoloid idiocy, myxedema or epilepsy and this brings him to the conclusion that the exogenous type of mental defect among prematurely born infants constitutes the majority. The practical conclusion which Brander draws from this investigation is that a more careful obstetrical prophylaxis must be carried out for the prevention of the exogenous type of mental deficiency.

This study may be a beginning in the right direction. Similar investigations may throw light on some of the still baffling psychiatric and neurologic problems.

The book is abundantly documented with charts, tables and case records.

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NEW LIGHT ON DELINQUENCY AND ITS TREATMENT. Results of a research conducted for the Institute of Human Relations, Yale University. By *William Healey, M. D., and Augusta F. Bronner, Ph. D.* (New Haven: Yale University Press, 1936.)

This book is the result of a three year study in three different cities of 153 delinquents belonging to 133 families. Five hundred seventy-four mem-

bers of the families were examined and 145 non-delinquents were studied, 105 of them being utilized as controls. It is pointed out by the authors that the research was originally planned for ten years and that the number of patients studied was too small to make statistical conclusions of much value. There is, however, a fair amount of statistics in the book, aiding somewhat in understanding the work done, although much of the statistics adds nothing new to the subject, as the authors themselves have stated.

To the reviewer, there are some parts of the book which are extremely valuable and which should be emphasized. The first chapter on the significance of delinquency is an excellent summary of the subject. It is the type of thing that one wishes particularly that judges and all those having to do with delinquency, and who have not had thorough psychiatric training, should read. The question as to why some people refrain from delinquency as being a problem to be studied, the observation that in the delinquent cases "there had been no strong emotional tie-up to anyone who presented a pattern of satisfactory social behavior," the statement that "conscience may cover only certain areas in the field of conduct," all these are ideas which should be more generally diffused.

The attempt to use controls by studying non-delinquents in the same family appears to be an excellent way to approach the problem, and the study of twins is obviously one of the most ideal ways of getting such controls. The book then continues the study of these cases in an endeavor to determine what the delinquency represents to the individual, and on this basis treatment is outlined, with an endeavor to evaluate such treatment. The last chapter, "Practical Implications of the Research," sums up certain conclusions and opinions of the authors.

The book should certainly be read by all those interested in the problem of delinquency and its treatment.

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THE NEUROTIC PERSONALITY OF OUR TIME. By *Karen Horney, M.D.* (New York: W. W. Norton & Co., Inc., 1937.)

This book is a refreshing rebellion against the orthodox Freudian doctrine in that it extends the etiology of the neuroses into other domains than the sexual phases of infancy and childhood. Most importantly, so far as the non-Freudian is concerned, it is a recognition on the part of those who do psychoanalysis of the social-cultural environment as a factor in the production of the neuroses, a discovery which the average practicing physician and the non-Freudian psychiatrist has taken for granted since Beard's day. This book is a belated discovery of America by a somewhat tardy Columbus.

The importance of the past, of the experiences of infancy and even of the fœtal state has been given exaggerated value by Freud and his followers. Dr. Horney seeks to bring the present, the adult life, into etiological relationship to the neuroses. She states:

"I do not consider it justified to focus our attention on childhood in a sort of one-sided fascination and to consider later reactions essentially as repetitions of earlier ones. I want to show that the relation between childhood experiences and later conflicts is much more intricate than is assumed by those psychoanalysts who proclaim a simple cause and effect relationship. Though experiences in childhood provide determining conditions for neuroses they are nevertheless not the only cause of later difficulties."

The author has evidently been greatly influenced by those anthropological writings which show that cultures differ widely, and that consequently the conduct of individuals in the various cultures has different norms. This, of course, is a classical attitude of psychiatry. It has long been known that the delusion, for example, is to be evaluated in accordance with the culture of the individual himself. As an illustration, if a Louisiana negro believes in Voodoo and governs his life accordingly, he is acting normally; whereas if a college professor were suddenly to embrace such a belief and to act in harmony, a psychosis would be reasonably suspected. The novelty of the book resides in the fact that a psychoanalyst has at last given weight and value to cultural factors.

Since the author regards anxiety as the central feature of the symptom-complex of the neuroses, she seeks to discover the difference between the neurotic and the non-neurotic so far as anxiety is concerned. Thus:

"The neurotic, however, not only shares the fears common to all individuals in a culture, but because of the conditions in his individual life—which, however, are interwoven with general conditions—he also has fears which in quantity or quality deviate from those of the cultural pattern."

She then makes another differentiation between the normal and the neurotic which is of interest (and arouses in the reviewer his skepticism):

"The normal person is capable of making the best of the possibilities given in his culture. Expressing it negatively, he does not suffer more than is unavoidable in his culture. The neurotic person, on the other hand, suffers invariably more than the average person. In fact, the neurotic is invariably a suffering person."

In a later stage she goes on to say:

"The neurotic himself may not even be aware of the fact that he is suffering."

The neurotic is described throughout the book as an individual incapable of feeling affection, although he desires love, and has "affect hunger" in a pathological sense. There is thus a long section which gives the various methods by which affection is secured. Securing affection in any form may serve as a powerful protection against anxiety, and the author pays especial attention to the varying techniques by which security is reached. Submissiveness becomes a way of satisfying anxiety and the desire for affection. The neurotic may attempt to reach power so as to secure himself against being hurt, the formula being, "If I have power, no one can hurt me." The final step for reaching security is withdrawal, which in addition to the meaning usually given this term also signifies the piling up of possessions, acquir-

ing affluence, becoming independent of others by one device or another, and so forth.

We are necessarily greatly interested, of course, in the author's definition of what is normal and what is neurotic. I cite an interesting paragraph. The neurotic and the normal are differentiated by Dr. Horney as follows:

"There are two characteristics, however, which one may discern in all neuroses without having an intimate knowledge of the personality structure: a certain rigidity in reaction and a discrepancy between potentialities and accomplishments.

"Both characteristics need further explanation. By rigidity in reactions I mean a lack of that flexibility which enables us to react differently to different situations. The normal person, for instance, is suspicious where he senses or sees reasons for being so; a neurotic person may be suspicious, regardless of the situation, all the time, whether he is aware of his state or not. A normal person is able to discriminate between compliments meant sincerely and those of an insincere nature; the neurotic person does not differentiate between the two or may discount them altogether, under all conditions. A normal person will be spiteful if he feels an unwarranted imposition; a neurotic may react with spite to any insinuation, even if he realizes that it is in his own interest. A normal person may be undecided, at times, in a matter important and difficult to decide; a neurotic may be undecided at all times."

Neither in Heaven nor on earth is there a normal person such as is implied in this paragraph. What is meant here is perfection in adjustment, not normality. The author continually shifts her definition of normality and neurosis to suit the situation. In fact, she takes the dangerous position that a person may have a neurosis without any symptoms whatever, and the diagnosis may be made by his personality or character pattern independently of any symptoms, thus following Alexander. As implied before, she states that the neurotic may not even be conscious of any difficulty or of any suffering, and in one place this statment is made concerning anxiety:

"Finally there are neurotic persons who are aware only of having depressions, feelings of inadequacy, disturbances in sex life, and the like, but they are entirely unaware of ever having or having had anxiety. Closer investigation, however, usually proves their first statement to be inaccurate. In analyzing these persons one invariably finds just as much anxiety beneath the surface as in the first group, if not more. The analysis makes these neurotic persons conscious of their previous anxiety and they may recall anxiety dreams or situations in which they felt apprehensive. Yet the extent of anxiety acknowledged by them usually does not surpass the normal. This suggests that we may have anxiety without knowing it."

The unregenerate may here whisper that very likely the patients have had no anxiety until the analysis brought it about. It is not unheard of in therapeutics that the cure brings about more damage than the disease.

The book goes on to deal at length with the various relationships between anxiety and hostility, the nature of sexuality, masochism, etc. We then run

into the "compensation by upside down," which is so flexible and bewildering a part of psychoanalysis. Thus, a domineering attitude is an expression of inferiority and anxiety, and a submissive attitude is likewise an expression of the same thing, although it may be an expression of superiority. Thus, retreat from woman and impotence may be the expression of a fear of woman, and an aggressive Don Juan career may have exactly the same significance. Love may basically express hate, and hate is the expression of a love that is concealed. This is the most convenient device of thought which ever appeared on the human scene.

Finally, after a long account of the neuroses, which space forbids me to analyze, we come to the last chapter which is called "Culture and Neurosis." In this chapter the author attacks the typical Freudian position, to wit:

"That wars are caused by the working of the death instinct, that our present economic system is rooted in anal-erotic drives, that the reason the machine age did not start two thousand years ago is to be found in the narcissism of that period."

While accepting the main theses of the Freudian doctrine, she states:

"The error consists primarily in assuming a quantitative instead of a qualitative relation. The relation is not between quantity of suppression and quantity of culture but between quality of individual conflicts and quality of cultural difficulties. The quantitative factor cannot be disregarded, but it can be evaluated only in the context of the entire structure."

With this very profound and somewhat unintelligible statement, she comes down to the typical difficulties inherent in our culture which mirror themselves as conflicts in every individual's life and which, accumulated, may lead to the formation of neuroses. These factors are—modern culture is economically based on the principle of individual competition. . . . . The psychic result of this situation is a diffuse hostile tension between individuals. . . . . This competitiveness and hostile tension pervades the entire life including the familial, economic, sexual—all relations of the human being are invaded by this factor. Consequently, there is a constant generation of fear. Therefore, this results psychologically in the individual feeling that he is isolated. Even when he has many contacts with others, even when he is happily married, he is emotionally isolated. Emotional isolation is hard for anyone to endure; it becomes a calamity, however, if it coincides with apprehensions and uncertainties about one's self.

This competitiveness, the author points out, is in direct contradiction with the Christian ideals which declare that it is selfish to want anything for ourselves; that we should be humble, turn the other cheek, be yielding. For this contradiction there are only two solutions within the normal range: "To take one of these strivings seriously and discard the other; or to take both seriously with the result that the individual is seriously inhibited in both directions."

There are many things to commend in this book and many things to criticize. The definition of the normal and the neurotic has a vagueness which is inherent perhaps in the subject matter and in the present state of knowledge.

Nevertheless, there is a great danger in making the term neurotic stand without a well defined substantive except the hazy one of character and person lity alteration without symptoms. A thorough search of any personality would disclose contradictions, dysharmonies and disorders of the "neurotic" type. There may be neurosis without symptoms, but until we know more about the neuroses it is hazardous to consider anyone neurotic who has no symptoms. In no other field of medicine than psychiatry, in no other field of science, would any such vagueness of definition be tolerated or given respectful hearing. To neuroses themselves, as they become defined in symptom groups, are amenable to something corresponding to scientific discussion. Without the solidity of symptom-complexes, we deal with adjectives unrelated to nouns, we live in too rarefied an atmosphere and too vague a flow of thought for anything really worthwhile from a scientific standpoint. Literary agility, subtlety, skill in manipulation, flourish under such circumstances and nothing can be proven or disproven. The race then lies to the verbally agile and the ingenious, but not to the scientific.

Moreover, there has always been competitiveness; there has always been fear; and every culture from time immemorial has by its taboos, inhibitions and injunctions contradicted the basic trends of the viscera and the personality. Probably of more new importance than the competitiveness and the contradictions present in our culture are the disturbances of rest and recuperation which are part of the stimulation given to man by his new instruments. Night has been turned into day by the electric light, and the annihilation of distance means that we can steep ourselves in the emotions engendered, let us say, by the conflict in Spain at the moment the conflict itself is raging, so that we become witnesses of every tragedy which is going on in our turbulent world. The conflict which takes place within the human being expresses itself in the case of those who succumb sooner or later by a disturbance of physiology, by an annihilation or diminution of rest; by disturbance in the appetites; by paresthesiæ; by altered activity of mind and body, in a word, by neurosis. For the time being we may rest content with the effort to study these basic alterations, and we need above all things to build up a physiology of the changes, so that psychiatry will not remain a place for the exercise of ingenuity, but a scientific field.

Meanwhile, it is of hopeful importance that a psychoanalyst has declared that other factors besides the "genetic" (which, by the way, is a wrong use of the term genetic) are of importance; that man does not only live in the past of his own life history but also in the present; that etiology, so far as neurosis is concerned, does not inhere only in the complexes of childhood and infancy, but that the social structure operates to produce dysharmonies in the more obvious human relationships, and thus becomes a potent force in the production of the neuroses. Add to this the fact that the style of the book is excellent, and the manner of presentation frank and vigorous, the result is a book worth reading by even the case-hardened Freudian and the equally hardy and prejudiced non-Freudian.

ABRAHAM MYERSON, M. D.,
Boston.

EUGENICAL STERILIZATION. By *Abraham Myerson, M. D., James B. Ayer, M. D., Tracy J. Putnam, M. D., Clyde E. Keeler, Sc. D., Leo Alexander, M. D.* (New York: The Macmillan Co., 1936.)

In May, 1934, the American Neurological Association appointed as a Committee for the Investigation of Eugenical Sterilization the gentlemen whose names appear as the authors of this book. The work of the committee was subsidized from a grant from the Carnegie Foundation. After two years of exhaustive research and painstaking work the committee has presented its findings in this 200-page volume.

A careful summary of this report, embodying its principal findings, conclusions and recommendations was prepared on request by Dr. Abraham Myerson, chairman of the committee, and appeared in the November, 1935, issue of this JOURNAL. It is therefore unnecessary to offer here an extended review of the book, and readers are referred to the article just mentioned. There can be no doubt as to the great value of this study which has surveyed the world's literature on the subject, and has endeavored to take into account the known facts of genetics and of the inheritance of the several conditions called mental diseases. The authors make plain the vast difference between the theories of eugenics and the established data of genetics, and demand that social planning and legislation shall be based upon the latter.

In their conclusions they recommend that any law concerning sterilization passed in the United States under the present state of knowledge should be voluntary and regulatory rather than compulsory; that any such law should apply not only to patients in state institutions but also to those in private institutions and those at large in the community. They suggest the type of board which should be set up for giving effect to such legislation.

Specifically the committee recommends sterilization in selected cases of certain diseases and with the consent of the patient or those responsible for him. They recommend that such selective sterilization be considered in cases of the following diseases (arranged roughly in the order in which sterilization would appear to be indicated):

(1) Huntington's chorea, hereditary optic atrophy, familial cases of Friedreich's ataxia, and certain other disabling degenerative diseases recognized to be hereditary.

(2) Feeblemindedness of familial type.

(3) Dementia præcox (schizophrenia).

(4) Manic-depressive psychosis.

(5) Epilepsy.

At the end of the volume will be found a 20-page bibliography and author and subject indices.

C. B. F.

In Memoriam.

JAMES RAMSAY HUNT.

1874-1937.

Dr. J. Ramsay Hunt died at his home in Katonah, N. Y., on July 22, 1937, after a long illness. Until the end he maintained that keen interest in neurology and psychiatry which had characterized his long and useful career in the practice of medicine.

Dr. Hunt was born in Philadelphia in 1874 with a prestige of medicine behind him, for his great-grandfather, William Hunt, was a surgeon and his grandfather, Jacob Hunt, was a physician. Dr. Hunt received his education first at the Friend's Central School in Philadelphia and later at the University of Pennsylvania where he received his degree of M. D. in 1893. Following this he spent some years in post-graduate study in the Universities of Vienna, Berlin and Paris and then returned to New York to the private practice of neurology and psychiatry.

Dr. Hunt's first interest was neurology and he did pioneer work in the diseases of the extra-pyramidal system. His writings on the geniculate ganglion syndrome, the pallidal system, dyssynergia cerebellaris myoclonica (Hunt's disease), and the static and kinetic systems of motility opened up new fields in the study of obscure nervous diseases. In his later years he turned away somewhat from organic nervous diseases and interested himself more in the big problem of the psychoneuroses. In carrying out his work in this new field he founded the neuropsychiatric division of the Neurological Institute of New York and was very active in furthering this service where psychoneurotics could receive adequate study and care.

He started his work as a teacher in the Cornell University Medical School in 1900 when he was appointed instructor of neurology, which position he held until 1910. At this time he went to the College of Physicians and Surgeons, Columbia University, as associate professor of neurology. He resigned this post in 1915 but

was appointed again by Columbia University as clinical professor of neurology in 1924, and in 1931 as professor of neurology which position he held at his death.

Dr. Hunt was throughout his life connected closely with the scientific societies and they offered him many honors. He served as president of The American Neurological Association, The American Psychopathological Association, The Association for Research in Nervous and Mental Diseases and the New York Neurological Society. He was a member of The American Psychiatric Association, the Association of American Physicians and corresponding member of the Société de Neurologie de Paris. During the war he served as consulting neuropsychiatrist to the Officers' Training School at Fort Myer, Va., and later in the same capacity in the A. E. F., France, with the rank of Lieutenant-Colonel. In 1931 his alma mater bestowed on him the honorary degree of Sc. D.

To Dr. Hunt's many friends in neurology and psychiatry his passing has been a personal loss. We knew him to be a sincere worker, a clear thinker and a loyal friend. The sincerity of his research work and the scholarly clearness with which he wrote made the value of his scientific productions. His kindly personality, his genial sense of humor, the warmth of his friendship made for us the Ramsay Hunt we all remember with affection.

LOUIS CASAMAJOR, M. D.

CORRELATIONS OF BEHAVIOR AND NEUROPATHOLOGY IN A CASE OF CEREBRAL PALSY FROM BIRTH INJURY.

By ARNOLD GESELL, Ph. D., M. D.,
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AND

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From the Clinic of Child Development and the Department of Pathology, School of Medicine, Yale University.*

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§1. Introductory.

The importance of bringing into correlation functional and pathological findings in the field of human neurology needs no emphasis. In the present instance the senior author, over a period of almost ten years, made repeated studies of the behavior development of a child presenting severe athetosis and recurrent spasticity.

* Several members of the staff of the Yale Clinic of Child Development participated in the study and the training of A. C. We are particularly indebted to the observations and assistance of Elizabeth Evans Lord, Burton M. Castner, and Ruth W. Washburn. Mrs. Mary McGrath had immediate charge of the intensive educational program, when A. C. was 10 years of age.

This boy came to necropsy at the age of 14 years and the brain, spinal cord and meninges were minutely investigated (by H. M. Z.). The following report summarizes with interpretive comment both the neuropathological and behavioral features. The psychological aspects of the case are particularly noteworthy because the neural lesions were well defined and uncomplicated. Anatomic study of the nervous system disclosed a typical picture of " status marmoratus " in the basal ganglia.

This condition was described by C. and O. Vogt, who found that the striatum in each of their eight patients had the appearance of marble due to the alternation of light and dark zones. The marble-like appearance, from which the syndrome got its name, was produced by patches of gliosis and delicate myelin fibers in a striatum which was nearly completely lacking in ganglion cells. The concomitant clinical picture was described as appearing at or soon after birth and consisted of epileptiform attacks, muscular spasticity, athetosis and generalized choreiform movements, compulsive laughing or crying and lack of mental development. Jakob included the description of a similar case in his monograph on extrapyramidal diseases.

With the account of Bielschowsky's case, it was recognized that *status marmoratus* is not restricted to the striate body, but may be present in the cerebral cortex as well. Likewise, it soon became apparent that the lesions were not necessarily a developmental anomaly, as the Vogts believed, but that they might be acquired at or some time after birth. This opinion has recently been expressed by Löwenberg and Malamud in their study of four patients. Whereas the histopathology and the etiology of this condition are discussed exhaustively in the literature, the behavioral data without exception are inadequate.

DEVELOPMENTAL HISTORY.

The patient, A. C., was born after a prolonged labor of 24 hours, at full term, weight 10 pounds, attended by a physician who was unaware of the difficulties of two previous parturitions. Two sisters alive and well, age 12 and 13 years at the time of his birth, had also been born in dystocia. There were two miscarriages. The patient's head was in sight at 7 a. m.; with delivery at 3 p. m.

The head was misshapen but no instruments were used and there were no evidences of hemorrhage, rash or desquamation. At birth, breathing was weak; artificial aid to respiration and hot water stimulation were administered; the breathing during the night was irregular. At about midnight the infant showed twitching of the left cheek, but he was neither limp nor rigid. Forty-eight hours after birth, he had convulsions of unknown extent and duration, possibly limited to the right side and associated with flaccid paralysis of that side. He was deeply cyanosed; his fontanelles bulged; there was marked bilateral internal strabismus. He failed to suck or swallow and was fed with a medicine dropper for ten days.

To the surprise of the physician the patient slowly improved at the end of two weeks and he was then able to take the breast. He took notice of his surroundings at about five months. The paralysis apparently disappeared and the child's development was regarded as relatively normal until about the age of six months when spasticity was noted particularly on the right side. Dentition started at about eight months, the left side distinctly taking the lead.

The facies at favorable moments wore an alert and friendly expression which gave an aspect of normality. It is a remarkable developmental fact that even at the age of six months A. C. showed a strong drive to reach for objects and fussed because of his inability to attain them. But his motor disabilities proved to be profound. He was never able to fully balance his head; nor to acquire control of the muscles of swallowing and of articulation. He was never able to sit up alone, to stand or to secure an object by self-directed prehension. He rotated his head and rolled on the floor at the age of one year. He supported his own weight when held by his mother at the age of three years and four months. His internal strabismus underwent almost complete spontaneous correction during the first year, and his oculomotor control was least impaired. Spasticity and athetotic movements involving face, arms and legs increased during the first four years. Contracture became more marked and the athetosis had shown very slight amelioration before he died from appendicitis near the age of 14 years.

§2. Early Behavior Status.

The patient came to our notice at the age of four years. In body length and weight he was slightly in advance of the average

for his age. He had suffered only a few minor illnesses; slept well, and was not markedly fatigable. His features and torso were well formed. His countenance was normal, attractive, and expressive for brief intervals when not in the throes of involuntary activity. He could not hold up his head, sit up, creep, reach nor manipulate. At times he was quiescent, but under the least excitement, arms, head, fingers, also face, mouth, tongue—and to a lesser degree, legs and toes—went into apparently aimless extensions, flexions and rotations, with antagonistic muscles shifting their ascendancy. Occasionally the double athetosis became extreme, the movements on the right side being most pronounced and abrupt. There was recurrent spasticity. Crossing of the legs disappeared on relaxation and was not associated with marked contracture. Right and left abdominal, cremasteric and Babinski reflexes were present; eye grounds and pupillary reflexes were normal; knee jerks were variably moderate or hyperactive. Spasms of the pharyngeal, lingual and associated muscles made swallowing, mastication, and phonation difficult. There was frequent salivation. These latter characteristics combined with the motor disability had led a previous physician to a diagnosis of mental deficiency.

Close study of the behavior patterns of this boy showed, however, that in no true clinical sense could he be classified as feebleminded. His general somatic development, and particularly his personality traits, indicated that he was potentially of normal or even superior capacity and that the birth injury had inflicted a selective rather than a pervasive damage to his behavior equipment. In spite of the extreme motor discoordinations, his personality remained relatively well integrated with well sustained and discriminating emotional attitudes toward his social environment. He won for himself a circle of friends among children of his own age, who visited him and managed to play with him on their own level of social maturity.

These personality characteristics must be given important weight, if we are to arrive at a just correlation of the behavior picture and the neuropathological picture. He was able with great efforts to express yes and no by crude head gestures which were so ungoverned that they resembled each other, but which his family could sometimes differentiate. He was practically unable to combine a consonant and a vowel, but he managed to make a few

slightly distinctive vowel sounds associated with different meanings. A single brief incident must suffice to convey an impression of the most normal aspects of his behavior.

He liked to be propped up at the window so that he could participate in the life about him. On one occasion (age four years) he was watching some construction work on the street. He saw the neighbors' children having great fun crawling through the big drain pipes lying by the side of the road. He became greatly interested. Though unable to articulate he ejaculated " I-I " in no uncertain terms. This was his most vivid utterance used whenever he was able to muster it, in all situations in which he wished to call attention to his own stake in any event or plan. It was his unmistakable way of indicating that *he* wished to crawl through those pipes, too. Doubtless he had enough " autocriticism " to know that he could not crawl; but he also had enough imagination and drive to desire all possible experience, from sliding down a banister to riding horseback. With the aid of his sisters he was brought to the entrance of the pipe, and by their combined efforts and his struggling cooperation, he was propelled through the big drain pipe tunnel, to his great delight.

His personality sense was so robust that he wished to have the same school-going status as his playmates. Partly for this reason and also to determine his learning capacities we devised from time to time " lessons " in " reading," " drawing " and " number work." There was little difficulty in enlisting a pupil attitude. By the age of seven years he gave sustained attention for 30 minutes in a reading lesson.

The accompanying graph summarizes the behavior status of A. C. at the age of 56 months. Various items in four major fields of behavior are rated on the basis of the Yale norms of behavior maturity. It is evident at a glance that the extreme defects in the motor field have not resulted in a comparable degree of retardation in other fields of behavior. But even the low ratings in motor performance need qualification in interpretation. (See Fig. 2.)

A normal infant, four months old, lying on his back can hold his head in the midposition, watch intently a rattle dangled above his chest; and can moreover bring both arms to the midline, close in on the rattle, and grasp it. A. C. was never able to execute this most elementary act of prehension; and yet he used his oculo-

motor muscles with alertness and perceived incongruities in a caricature drawing of a man. The limitations of his experience in manipulation and locomotion did not inflict a drastic arrest of his perception and appreciation of spatial relations.

Likewise in the field of language. His actual utterance was at a meager, infantile level; but his comprehension of words and even verbal nuances seemed to be near a normal level. In number comprehension he distinguished between two and three telephone rings and probably had a concept of four. His humor sense, his amusement at accidental absurdities in the home life, his story and play interests, all suggested a considerable approximation to normality in the perception and appreciation of social relations.

§3. Later Behavior Development.

On the basis of the behavior picture at 56 months of age, it was not easy to predict the subsequent course of development. To what extent were the foregoing indications of normal though atypical behavior characteristics borne out in the subsequent nine years of life? This question is of theoretical interest from the standpoint of neurological development. It also has practical implications for the problems of treatment and of corrective education.

Even before the age of five years, as already suggested, A. C. showed a certain eagerness to be going to school. For this reason his early contacts with the clinic had been converted into blackboard lesson periods which served him as a substitute for school, and gave us an opportunity to observe his response to the teaching of words and numbers. Ordinary methods could not be used. We had to rely on his rather ambiguous yes-no head gestures, on crudely differentiated phonations, on facial expressions, to establish communication. With the aid of the blackboard it was possible to present words, incomplete sentences, incomplete drawings, numbers and sums. By devising games it was possible to test with varying degrees of certainty his powers of recognition and memory.

In a few sessions he learned to distinguish simple words like *ball, cat, hat, man.* By the age of seven years he had learned to recognize with variable success perhaps 35 words. In listening to stories his interest had advanced from *Black Sambo* to *Three Bears* to *Grimm's Fairy Tales.* There was hope that with greater



FIG. 1.—A. C. at advancing age levels: 9 months; 14 months; 3½ years; 5 years; 13 years.



FIG. 2.—Growth graph showing the developmental status of A. C. at the age of 56 months.

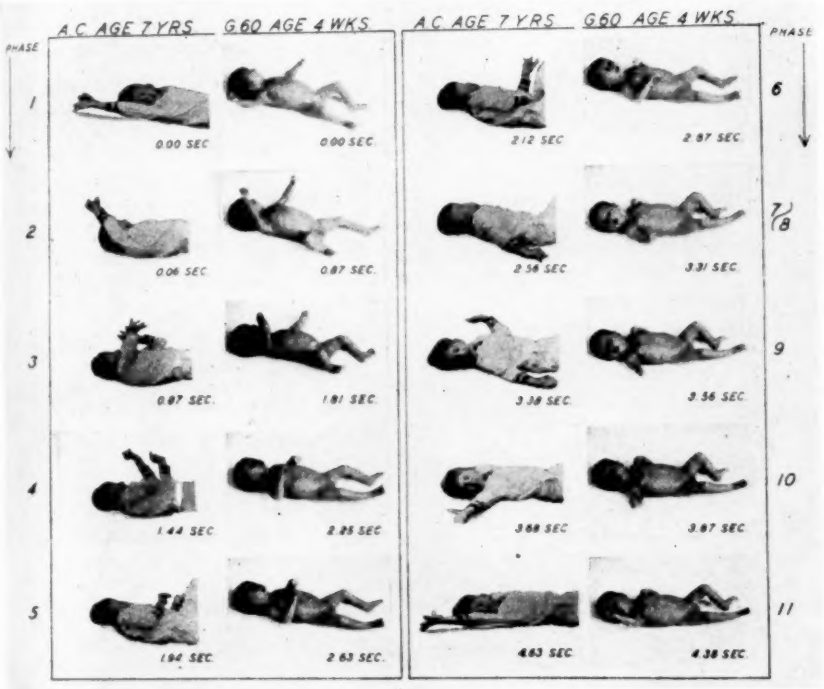


FIG. 3.—Comparable consecutive phases of the athetotic action pattern of A. C. age 7 years and of the spontaneous supine action pattern of a normal infant, G60, age four weeks. Eleven phases with the elapsed time indicated in seconds are shown side by side in vertical columns.



FIG. 4.—Micro-photographic section. *Status marmoratus* of lenticulate and thalamic nuclei (phosphotungstic acid-hematoxylin stain).



FIG. 5.—Micro-photographic section. *Status marmoratus* of lenticulate nucleus (Kulschitzky stain).



FIG. 6.—Micro-photographic section. Region in putamen showing poorly formed, coarse and delicate myelin fibrils (Kulschitzky stain).

maturity he might learn to read. He had even made some progress in holding a large crayon thrust in his hand, but had made no gain in directing it. His attention span and his social maturity showed a slight, steady increase. His " lessons " at home and at the clinic were irregular and occurred about once a week. At the age of 8½ years his attainments were reviewed and it was concluded that he showed essentially the same ability to deal with printed words and numbers which he had shown at the age of five years. He gave no convincing evidence that in power of abstraction or true ability to read he was equal to the intellectual level of a normal six-year-old.

For another year his " schooling " continued in a rather desultory manner. His articulation improved slightly. At favorable periods of relative relaxation he could " pronounce " numbers up to 10, with crude phonetic discrimination of the vowel values. He had scarcely any command over consonants. At the age of 9½ years he had a recognition reading vocabulary of about 50 words.

In spite of the limitations revealed by this rate of progress, it was decided that the potentialities of intellectual development could only be determined by a more systematic teaching program. It might well be that A. C.'s training thus far had been too incidental and irregular to overcome his profound handicap. A skilful teacher was engaged over a period of six months to give training five times a week in two-hour sessions. As a stimulus and to satisfy his ambition to attend a real school, the lessons were conducted in a separate room of an elementary school. A reading frame was placed athwart his perambulator; interest provoking devices were used, but the earlier playful approach gave way to a more serious attack. He made a good adjustment to the new régime. He soon was scanning with his eyes seven successive pages of the book supported in the reading frame. The eye movements accompanied by vocalization, inflections, and tongue movements gave the appearance of silent reading.

His behavior and his story interests were more mature than they had been. By the end of the six months he increased his reading vocabulary to about 100 words. But again it was not clear that he read with full insight. His progress in simple number operations was meager. He showed only occasional spontane-

ous interest in reading by himself at home. The significance of these limited responses to more intensive training will be discussed later.

During the four remaining years prior to his death he made only slight academic gains. He matured however in his emotional life and his social interests. He learned to play a simple game of checkers, attending closely for 20 minutes. He named his moves by vocalizing the number of a checker and indicated right or left by yes or no. He showed a preference for boy companions of his own age, and also gave signs of preadolescent bashfulness. He could read the clock and was permitted to play the part of monitor in a rural school room which he attended daily for an hour.

His neurological symptoms were only slightly ameliorated in spite of the fact that physiotherapy treatments were faithfully continued for years. His cooperation in the muscle training was excellent both at home and at the hospital, and he showed morale in enduring the pain which resulted from manipulations to overcome contracture. The spasticity of arms and hands somewhat diminished. He learned to open his hand voluntarily on many occasions. He was able to sit for a half hour supported by pillows, without falling. Salivation decreased and articulation was slightly improved. In the intellectual sphere his rate of later development was distinctly slower than it had been during the first five years of his life. There is evidence that in the emotional and social spheres his development was slowly advancing and that he would have continued to mature during the period of adolescence.

§4. The Action Pattern of Athetosis.

The outstanding characteristic of the observable behavior of A. C. was his extensive, ever recurring athetosis. He appeared to be dominated by athetotic movements, which, nevertheless, contained or concealed whatever controlled motor adjustments he might muster. From a neurological and also from a psychological viewpoint, it seemed important to analyze the nature of these athetotic movements as clues to brain states.

Athetosis is none too clearly defined in the literature. The available descriptions show a wide range of emphasis and specification. In general these descriptions are colored by the vague concept of

"overflow" and stress the aimlessness of the movements with such phrases as "mobile spasm," "wild wriggling and twisting," "convulsive flood of energy," "irregular, choreiform, vermicular," "chaos of writhing movements," etc. Says W. Russel Brain: "In bilateral athetosis the patient exhibits frequent grimaces resembling caricatures of normal facial expressions of all kinds." Wechsler characterizes double athetosis as "mass or widespread movements involving practically all of the muscles, especially the hands, feet, and face."

Are athetotic movements as incoherent and formless as many of these characterizations suggest? We have at our disposal a method which should help us to answer this question, namely cinemanalysis.* The cinema records all movement in rapid registrations (16 photographic frames per second in the ordinary 16 mm. film). Naturally the cinema "sees" more comprehensively than the most acute clinical eye. It registers completely and remembers infallibly simultaneous attitudes of head, trunk, arms, legs, eyes, fingers, face. Each frame crystallizes a movement of behavior in its total synthesis and permits us to study this moment as a frozen section of motion. Cinemanalysis consists of a sequential analytic study of such cinema frames to define the successive phases of any behavior in terms of time and space. By the method of cinemanalysis it is possible to determine the presence or absence of pattern in the disordered motility of athetosis.

For study we had available approximately 325 feet of film depicting athetotic behavior at the 7, 10, and 13 years of age levels. These cinema records were inspected with the aid of the projection desk. Special attention was given to the movements and positions of the arms and head. Numerous tracings were made showing successive phases of the moving members. The tracings and descriptive notes were then reviewed to ascertain whether there

*The method of cinemanalysis is described at length in references 6, 7, 8. A projection desk is used to facilitate analysis. A projector under convenient control throws a succession of small images on a viewing glass incorporated as a window in the working surface of the desk. By turning a crank we view the images in full motion or slowed motion, forward or reverse. By arresting the crank any frame may be studied as a stilled pattern phase and the whole record may be subjected to frame by frame analysis. A counter registers each frame (time value: 1/16 sec.) as it passes through the projector.

were any recurring trends in the sequences and configurations of activity. After this review, a similar study was made of the spontaneous head and arm movements of supine normal infants at the 4, 6, 8, and 12 weeks levels of maturity.* The preliminary results of this comparative analysis, as summarized below, clearly show that a large part of the athetotic behavior falls into definite patterns which recur repeatedly at one age and which also remain from age to age.

An action pattern is a total movement which occurs consistently in a given situation and exhibits a characteristic course. This course is manifested in an orderly sequence of attitudes or pattern phases in the moving members. In the present instance, we shall deal chiefly with the athetotic movements of head and arms while the subject is in either the supine or supported sitting position. Cinema records were made at 7, 10 and 13 years. One characteristic action pattern was displayed at each of the three age levels.

When inspected by cinemanalysis the typical cycle of action revealed itself in 11 distinguishable pattern phases which will be presently described. The tenth phase in this sequence is of special significance, because it is equivalent to the tonic-neck-reflex (t. n. r.) which is the most prominent behavior pattern in the repertoire of the normal supine infant during the first 12 weeks of life. This pattern bears some resemblance to a boxing attitude: the infant holds his head averted to one side, the arm on that side is maintained in outward extension, the opposite arm is flexed so that the hand rests near the occiput. Magnus has demonstrated a similar pattern in quadrupeds. This postural set plays a fundamental rôle in the mechanics and the developmental morphology of early infant behavior.

* The supine behavior of these normative infants is delineated in Gesell, A. *et al.: An Atlas of Infant Behavior: A Systematic Delineation of the Forms and Early Growth of Human Behavior Patterns,* illustrated by 3200 action photographs in 2 volumes. Volume *One: Normative Series* (in collaboration with Helen Thompson and Catherine Strunk Amatruda), pp. 1-524. Volume *Two: Naturalistic Series* (in collaboration with Alice V. Keliher, Frances L. Ilg, and Jessie Jarvis Carlson), pp. 525-922. New Haven: Yale University Press, 1934. Pp. 922. (See Volume One, pp. 50-67.) See also Gesell, A., and Thompson, H.: *Infant Behavior: Its Genesis and Growth.* New York: McGraw Hill Book Co., Inc., 1934. Pp. 333. (See pages 49-61.)

The t. n. r. attitude proved also to be an important feature in the behavior of A. C. Its presence was obscured by the lively athetotic movements, but when the cinema films were quantitatively studied it was found that he was in a t. n. r. posture from 41 to 56 per cent of the recorded time at 7, 10, and 13 years. It was also noted that the head generally took the lead in initiating the t. n. r. posture. In eight instances out of 11 the head movement occurred palpably in advance of the appropriate arm extension. In another instance it occurred slightly, but perceptibly, in advance. In one instance the extensor arm and in another instance the flexor arm took the lead. But in no instance was a reversed t. n. r. attitude assumed. The head was always directed toward the extensor arm. This suggests that the proprioceptive stimulus in the neck, as adduced by Magnus, was operating to bring about the natural reflex.

The typical athetotic pattern of A. C. displayed the following sequence of phases, which occurred (as does the normal t. n. r) in either left or right armed versions:

1. The active arm is extended above the head, elbow close to the head; the head is rotated facing toward the extended arm; the contralateral arm remains flexed at the shoulder level.

2. The head rotates to mid position; the arm, still extended, swings across the face with a downward motion; the flexed contralateral arm moves slightly downward.

3. The head remains in mid position; the arm flexes slightly and continues down across the face; contralateral arm moves downward so that it is flexed at waist level.

4. The arm continues downward, still flexed; hand comes above waist level; contralateral arm is in a similar position.

5. Active arm continues downward, still flexed; hand comes to waist level; contralateral arm in same position as active arm.

6. Active arm continues downward; contralateral arm starts upward.

7. Active arm extends as it moves downward; contralateral arm, still flexed, moves upward.

8. Active arm comes to full downward extension beside the body; contralateral arm moves upward.

9. Head rotates toward the side again, facing active arm; contralateral arm flexed upward with hand at shoulder level.

10. Active arm in full extension comes to shoulder level; head is turned so that face is toward extended arm; contralateral arm is flexed with hand near occiput (t. n. r. posture).

11. Extended arm moves upward in extension, above and close to head; contralateral arm remains as in phase 10, thus reinstating phase 1 when the cycle is repeated.

The above sequence may be envisaged as a slashing windmill reaction emerging out of and returning to a basic t. n. r. attitude (phase 10). Phase 11 is a transitional phase which usually reinitiated the cycle. Variations of the typical sequence were confined to the terminal phases (10 and 11) which were sometimes repeated as " fragments "; and to phases five and six, in which the downward movement was replaced by an upward flexion of the forearm, bringing the hand up to the chin. This substitution of movement might occur only once, or under excitement two or three times in close succession, simulating an uncontrolled perseveration, whereupon the subsequent phases resumed their typical course.

PATTERN PHASE ANALYSIS OF THE ATHETOTIC ACTION PATTERN.

(Duration Indicated by Frames.)

	Specimen.			
Phase.	One.	Two.	Three.	Four.
1	0	0	0	0
2	7	8	10	9
3	5	7	13	3
4	3	8	5	3
5	4	8	3	10
6	3	7	11	5
7	7	2	8	6
8	6	9	6	5
9	8	4	2	8
10	17	3	5	12
11	10	10	11	4
Total no. of frames	70	66	74	65
Duration of total sequence in seconds	4.6	4.2	4.10	4.1

A frame by frame cinemanalysis of the athetotic action pattern at the age of seven years was made to determine the time values of the eleven consecutive phases. These values are given in the table above. Four specimens of the pattern were analyzed. The duration of each phase is indicated by the number of frames listed in the vertical columns. The total duration for the entire action pattern is also indicated in seconds. Although the time values for single phases varied slightly, the total durations for the total cycle showed a surprising degree of consistency.

Most of the observable behavior of A. C. conformed to the basic athetotic pattern described above. When the typical cycle was not

in evidence either in part or as a totality, the patient was either quiescent or the activity consisted in trunk torsion, bilateral adduction of the arms and simultaneous drawing up of the legs.

The typical athetotic cycle was observed both in the spontaneous supine behavior and also under the prolonged stimulation of a stimulus object which was dangled within reach of the subject while he strove to prehend it. It is significant that the basic athetotic pattern lost none of its integrity under the stress of apparent voluntary effort.

§5. Comparison of Athetotic and Normal Behavior Patterns.

In order to better define the distinctive features of athetosis we made a comparative study of the spontaneous supine behavior of normal infants from 4 to 12 weeks of age. Reviewing our normative records of these infants we found amazing correspondences between the athetotic and the infantile movements. The reader can gain some impression of these correspondences by examining the accompanying Fig. 3, in which comparable consecutive phases are depicted side by side. Both with respect to sequence and total elapsed time there is a high degree of correspondence. In general the supine behavior patterns of A. C. at the age of seven years most closely resembled those of a four weeks' old normal infant. Such an infant thrusts his arm in upward extension and makes slashing, windmill motions which momentarily are strikingly like those of A. C. Likewise the characteristic t. n. r. interdependence of the active arm and the head position is more clearly revealed at four weeks than at the later ages. As the normal infant matures, the t. n. r. loses its unitary simplicity and the various components, namely head rotation, arm extension, contra-lateral arm flexion, and leg extension, assert themselves with partial independence.

Interestingly enough this tendency expressed itself also in A. C. as he grew older. A. C. at 10 years still displayed the early windmill slashing but in several respects the postural behavior more closely approached that of the normal eight weeks infant. At 13 years of age A. C. showed a few approximations to the type of supine behavior found in a normal infant at 12 weeks. His arms came less frequently into full downward extension, and remained above the waist level.

When the athetotic and the normal behavior patterns are viewed in full motion on the screen, significant contrasts emerge.* In synergy and smoothness of performance, A. C. never equalled the normal infant. A. C.'s movements were, in comparison, stereotyped, abrupt and jerky. In spite of their temporal jaggedness, however, they pursued in space a route similar to that of the infant. When slowed down (through time magnification) the athetotic pattern acquires a spurious fluency. These contrasts, however, should not obscure the neurological implications of the correspondences established between the athetotic and the normal infantile patterns of behavior. Before attempting further interpretations, the neuropathological findings will now be summarized.

§6. Neuropathological Findings.

Macroscopic.—The cerebrospinal leptomeninges were everywhere delicate and translucent, being free from exudation and blood pigment deposition. They were not unusually adherent to the underlying nervous parenchyma. All the cerebral convolutions were well developed, and the cerebral sulci were normal in width and depth. There were no anomalous formations in any of the larger pial vessels. All the cranial nerves appeared to be normal. The pituitary body was wanting in the specimen, but the infundibular stalk was in place behind the optic chiasm and was not unusual in any respect. The pineal body was of the usual size, color and consistence.

Numerous sections of the cerebrum revealed no abnormalities in the cortical gray matter as regards the width and color of the laminæ. The cortex was well defined from the subcortical white matter. The centrum ovale presented the usual color and consistence. When sectioned in a horizontal plane the upper half of the left basal ganglions contained striking changes in the lenticular and thalamic nuclei. The changes consisted of gray and white irregular mottlings which were associated with unusual firmness of the involved nuclei. Changes similar to these were also noted

*A 16 mm. cinema reel, 225 feet in length, has been edited to show the typical behavior of A. C. at 7, 10, and 13 years and to delineate by comparative examples the spontaneous supine behavior of a normal four weeks' old infant.

in the right basal ganglions at a similar level. The globus pallidus on either side appeared to be intact, the lesion in the lenticular nucleus being confined to the putamen. A similar but less extensive change was present in both caudate nuclei. The lesions seen in the basal ganglions were typical of the macroscopic picture of *status marmoratus*. The corpora quadrigemina and red nuclei appeared to be normal. Although poorly pigmented, the substantia nigra was well defined and of average size. Nothing abnormal was seen in the cerebellum, pons and medulla. Multiple transverse sections of the spinal cord failed to reveal any definite lesions.

Histologic.—There were no deviations from the normal in the cerebral and spinal leptomeninges. The pial and parenchymal vessels also presented no abnormalities. The cortical cyto-architecture of the frontal, temporal and parts of the parietal lobes was altered as a result of destruction or lack of development of the ganglion cells. The third and fifth laminæ were especially affected, the paucity of ganglion cells in these layers being rather conspicuous even with low magnifications. Few changes of this variety were present in the cortex of the occipital lobes. There were no definite glial scars in any part of the cortex.

Dense glial scars were demonstrable in certain parts of the thalamus with victoria blue and phosphotungstic acid-hematoxylin stains (Fig. 4). The scars were usually stellate in shape and of small size, but occasionally they were confluent and large. They were most conspicuous in the pulvinar and in the ventro-median thalamic nuclei. Although present around blood vessels, they appeared to have no particular predilection for the vascular system. In Kulschitzky preparations there were found fine and coarse myelin fibers in the scarred zones which were so arranged as to form the well recognized picture of *status marmoratus* (Figs. 5 and 6). The geniculate bodies were not altered in this manner. The pallidal nuclei showed but a minimum involvement of this type; this was also true of the tuberal nuclei of the hypothalamus, but the periventricular gray and the nuclei of Luys were more extensively altered. The internal capsules were normal whereas the putamina were strikingly scarred and the caudate nuclei only slightly less so. The red nuclei and substantia nigra were essentially unchanged.

There was no evidence that this process, *status marmoratus,* was a progressively destructive one. There were no fat granule cells and no reactive glia. The scars were associated with an increase in the small round oligodendroglia.

The pons, medulla and cerebellum, as well as the spinal cord, were esentially normal.

§7. Tabular Summary of Neuropathological and Behavioral Findings.

The table on pages 521 to 525 provides a condensation of the neuropathological and behavioral findings, for the convenience of the reader. The left hand column lists the various structures of the central nervous system and their neuropathologic condition; the middle column, the normal function ascribed to these structures; the right hand column, the actual functions observed or inferred in A. C. The letters *N* and *D* (sometimes shaded by plus or minus signs) indicate respectively a normal and a defective (or deficient) histological condition. In the right hand column the presence, absence, or questionable status of a given function is indicated by +, −, and ?. The middle column of ascribed "normal" functions is to be taken schematically rather than literally, as a basis of reference for interpreting the observed functions tabulated in the third column. It is not assumed, of course, that any one level or structure functions independently, without participation by other parts of the nervous system.*

§8. Interpretation of Behavior Characteristics.

With the foregoing data, both pre-mortem and post-mortem, before us, we may attempt to formulate an interpretive summary of the behavior characteristics with special reference to the neuropathological findings. These characteristics will be discussed in

* For a compact orientational discussion of neurological and psychological relationships, the reader may consult two companion articles which recently appeared in *The American Journal of Psychology* (April, 1937): Papez, James W., The brain considered as an organ: neural systems and central levels of organization. *Amer. Jour. Psychol.,* 1937, XLIX, pp. 217-232; and Bentley, Madison, The psychologist's uses of neurology. *Amer. Jour. Psychol.,* 1937, XLIX, pp. 233-264. See also Cobb, Stanley, A preface to nervous disease. Baltimore: William Wood, 1936, vii + 173.

For explanatory comments on the construction of this table see the adjoining page (p. 520).

STRUCTURE AND PATHOLOGY.		ASCRIBED NORMAL FUNCTION.	OBSERVED FUNCTION.
AUTONOMIC SYSTEM			
Cranio-sacral	N	Appetitive and organic sensation	+No deviations noted
Thoracico-lumbar	N	Preparatory emotion	+"Avalanche" emotion, blushing
SPINAL CORD			
Spino-medullary tracts	N	Proprioceptive impulses	+Present but uncontrolled for purposeful
Lateral spino-cerebellar	N	Proprioceptive impulses	+ movement
Interspinal	N	Proprioceptive impulses	+
Spino-thalamic	N	Pain and temperature	++(Exaggerated sensitivity)
Cerebro-spinal	N	Efferent conduction	
Rubro-spinal	N		Spastic crossing of legs
MEDULLA			
Nuclei, gracilis	N	First proprioceptive relay	+
Nuclei, cuneati	N	Sustained segmental reflexes	+
Medial lemniscus	N	Conduction to thalamus	+
Inferior olives	N	Relay for nuclei gr. and cuneatus	+
Nuclei, cranial nerves	N	Vegetative regulation	+Vegetative functions all relatively intact and under fair regulation

This table is continued on four following pages.

STRUCTURE AND PATHOLOGY.		ASCRIBED NORMAL FUNCTION.	OBSERVED FUNCTION.
CEREBELLUM			
Afferent tracts	N	Conduct proprioceptive impulses	+Complete absence of balance in sitting and standing. Intermittent head balance
1, dorsal; 2, nuclei gr. and cn.; 3, inf. olives; 4, lateral; 5, vestib.			
Efferent tracts	N—	Conduct impulses of coordination, modification and reinforcement	+But largely inoperative
Superior peduncles			—
Cerebellar-rubral			—
Cerebellar-thalamic			
Cortex	N	Energizes	++
		Checks and modulates	—Asynergia, arythmia
		Dual transformer (excita. and inhib.)	—Dysmetria, due chiefly probably to cerebral factors
MIDBRAIN			
Inferior colliculi	N	Subcortical center, hearing	++Hypersensitive to shrill sound; auditory localization present
Superior colliculi	N	Visual—motor responses	+Eye following. Discriminative eye
Nuclei: nerves III, IV		Oculo-motor impulses	+ movements in reading
Tegmentum-substantia nigra	D—	Regulation of postural tonus	—Basic postural tonus present but unregulated
Red nucleus	N	Maintains "lasting" posture back-ground on which cerebellar checks imposed	+?
Extra pyramidal tract	N—		—Basic postural set absent

Extra pyramidal tract	N—		—Basic postural set absent

STRUCTURE AND PATHOLOGY.		ASCRIBED NORMAL FUNCTION.	OBSERVED FUNCTION.
THALAMUS: Afferent			
1, Medial genic. bodies	N	Afferent; hearing	+Sufficient cortical elaboration
2, Lateral genic. bodies	N	Afferent; vision	+
3, Pulvinar	D	Afferent; vision	+
4, Lateral nuclei	D	Cutaneous sensib., trunk, limbs	+?
5, Ventral medial nuclei	D—	Cutaneous sensib., face	+
6, Ventral lateral nuclei	D	Proprioceptive impulses	?
7, Arcuate n. (cbl.-th. tr.)	D—	Propriocep. and intra-neural excita.	?
Spino-thalamic tract	N	Pain	++Present and partially controlled
		Affective toning: pleasant	+Normal mood variations
		Affective toning: unpleasant	+
Thalamo-cortico radiat's	N	Affective quale through reverbera.	+?
THALAMUS: Efferent			
Sub-thalamus	D	Mediates extr-pyr. impulses	—Vol. control applied but ineffective
Central nucleus	D++	Postural reactions	—Double athetosis
Nuclei of Luys	D	Postural reactions	—Double athetosis
Tuber cinereum	D	Visceral reactions and olfaction	+Apparently not affected
Mamillary nucleus	N	Feeding reactions; metab. regula.	+Unimpaired
OLFACTORY LOBE	N	Impulses to mamillary n.	+Sense of smell

STRUCTURE AND PATHOLOGY.		ASCRIBED NORMAL FUNCTION.	OBSERVED FUNCTION.
Corpus Striatum			
Internal capsule	N		
Thalamo-cortical radia.	D—	Motor valves for purposive and postural responses	
Pyramidal tracts	N		
Lentiform nucleus	D++	Reciprocal, associated stereotyped reactions	
Globus pallidus	D+		
Putamen	D++	Food seeking and rejection	±Impaired
Caudate nucleus (ant.)	D+	Chewing, swallowing, nursing	±Impaired
Neuropathology: marked *status marmoratus*		Laughing, crying	±Defective (simple phonation)
		Facial expression	±Discriminative but inconstant
		Eye-hand coordination	±Impaired but control applied
		Walking	—Absent
		Prehension	—Absent, but control applied
			Attempted reaching at six months
Cerebrum			
I. Supra-granular cortex plexiform	N	Diffuses and summates impulses which come from middle layer	+Secondary reduction from impairment at Layer II and lower levels
Receptive zone-small cells not part of white bands			
II. Middle granular (pyramidal)	D—	Exteroceptor and interoceptor	±Slight impairment from cell reduc. Imperfect organization from defects at lower levels, but behavior drives and dispositions relatively normal in quality
Incoming fibers—small, medium, large			
Pyramidal cells (necrobiotic mottling)			
			Secondary intellectual retarda. from imperfect implementation

			Secondary intellectual retarda. from imperfect implementation

STRUCTURE AND PATHOLOGY.		ASCRIBED NORMAL FUNCTION.	OBSERVED FUNCTION.
III. Stellate layer	D—		
IV. Infra granular	N	Discharges impulses	±Impulses spasmodic. transmitted but not under phasic cont.
Emissive zone			
V. Polymorphic:	D—		±
a. Motor area	N—		±Normal motor intent based on visuomotor imagery
b. Receptive areas:			
Propriocept. and cutan. postcentral gyrus	N	Receiving station	+Senses and judges normal kinesthesias but suffers from obtrusive, conflicting images and impulses
Parietal		Combina., elabor., interpreta.	
Superior parietal gyr.		Cutaneous sensibility	
Post central gyrus		Muscle sensibility	
Visual	N		+Visual and auditory acuity normal
Auditory	N—		+Social and intellectual insight and elaboration normal in quality but impoverished
c. Association areas:		Collect, distribute, integrate, elaborate, irradiate, converge	
Frontal	N—	Phasic control of voluntary movements	±Present but very ineffective
Speech centers (Island of Reil)	N—		±Verbal comprehension relatively normal at concrete levels

relation to (a) autonomic behavior, (b) sensori-motor behavior, (c) intellectual abilities, (d) social behavior and personality.

(a) *Autonomic Behavior.*—The integrity of autonomic and vegetative behavior was preserved to a remarkable degree. There were no marked deviations in visceral, circulatory, respiratory, and pupillary reactions. Sphincter control was established at a fairly early age. Facial flushing occurred on exertion and also on excitement; but there was very little emotion of the floodgate or avalanche type. In spite of the cortical and thalamic damage above noted, A. C.'s emotional morale and affective organization were normal in their general character and vitality. The mamillary nucleus which is believed to govern feeding reactions and to participate in metabolic regulation apparently escaped unharmed by the prolonged ischemia. This was probably due to the extraordinary richness of the blood supply of this structure. Therefore notwithstanding severe damage to the putamen and caudate nucleus which also preside over feeding functions, A. C. was able to nurse at the breast at the age of two weeks.

Normally the reciprocal relations between the autonomic and higher centers are intimate. In spite of the intracranial damage these relations were in A. C. either only slightly impaired or the autonomic systems showed great capacity to function effectively in spite of defects in the normal neural connections.

(b) *Sensori-Motor Behavior.*—The nature of the limitations of A. C. in this field of behavior has been partly suggested in the analysis of his athetosis. His most fundamental and most crippling incapacity lay in the mechanisms of prehension, posture, and locomotion. Although the tactile and proprioceptive factors in these mechanisms were injured, the disablement was perhaps chiefly caused by the interruption of the efferent tracts. The energizing and to some extent the directive factors for prehensory and postural reactions were not wanting. Even at six months of age, A. C. showed an unmistakable propensity to reach,—a remarkable fact, for he never attained a neuromotor equipment to execute prehension, or to exercise the basic function of active touch.

In A. C. many phases of sensory experience were preserved. His vision was acute though we cannot be too sure that geometrically his perceptions were normally or precisely configured. His hear-

ing likewise was ordinarily acute. In spite of defective head control he showed proficiency in auditory localization. Taste, smell and passive touch and pain sensitivity were apparently normal. The neuropathological preparations show no impairment of the cerebral sensory areas for vision and only slight involvement of the hearing center. The calcarine area, ordinarily very susceptible to damage, was unharmed. The oculomotor muscles functioned and supplied important kinesthetic data.

In the field of grosser motor activity, however, his sensory implementation was probably blurred because of indistinct and obsessive kinesthetic experience. This inference is supported by the introspection of persons similarly though less severely handicapped. These persons report that their motor difficulties are greatly increased because the faulty motion formulæ of nonadaptive movements continually obtrude. The patient cannot achieve adequate (cortical?) engrams of movement unless the subcortical equipment is sufficiently accessible to permit progressive control of a given action system.

This is the condition of re-education. Engrams of movement are not localized as discrete mosaics in the cortex; but rest upon widely ramifying functional relationships with the lower levels of the neuro-motor equipment. The apex of such a ramifying system was almost completely isolated in the case of A. C. He failed to acquire articulate speech, the power to grasp and manipulate, and the capacity to sit, stand, creep or walk, for reasons which neurologically were essentially one and the same.

Voluntary control of postural adjustments and locomotion requires the equivalent of cortical engrams. The limitations of A. C. in the field of postural behavior can be best considered in relation to the tonic neck reflex—a fundamental " reflex " common to higher quadrupeds and man. In man this reflex figures in the ontogenesis of prehension as well as of body posture and locomotion.

The presence of the tonic neck reflex has sometimes been interpreted as a symptom of extensive damage to the central nervous system. This interpretation calls for some qualification. Our normative studies have shown that at the age levels from 4 through 12 weeks, two-thirds or more of normal infants in the supine position spontaneously assume a t. n. r. attitude of head and arms. At the age of 16 weeks the head begins to seek a mid position more

frequently; the t. n. r. retreats and gives way to more symmetric attitudes of the arms. At a transitional age, in a favorable normal subject, we have been able repeatedly to elicit in alternating succession a right t. n. r., a left t. n. r., a right t. n. r., etc., simply by slowly moving a hand back and forth across the infant's field of vision. This manœuver induced head following and with each rotation of the head to one side, the characteristic postural attitude ensued as though one were dealing with an automaton under photo-electric control.

Now the t. n. r. does not of course preserve a stereotyped invariability in the human infant. It undergoes important differentiations and complications with the maturation of postural behavior in general. It is also, probably, influenced by learning factors which perfect phasic or rhythmic executions of the patterns, manifested in wriggling, in extrication responses, in prelocomotor diagonal and creeping movements. Indeed, as the child grows older he displays two variants of the t. n. r., namely (a) the homolateral form (in which both extremities on the side to which the head is directed are in extension); and (b) the contralateral form (in which the arm only and the opposite leg are extended.) The latter prefigures the diagonal posturing at the basis of prone locomotion.

Cinemanalysis of the athetotic movements of A. C. at 7 to 13 years of age, shows that he repeatedly assumed the t. n. r. attitude, in the course of his spontaneous activity in the supine position. This might be interpreted to mean an arrest of postural development at an early infantile stage; for a comparable predominance of the t. n. r. response normally is characteristic of the first quarter of the first year. Such an explanation seems to us an over simplification. The t. n. r. asserts itself in A. C. when other more complicated reactions are impossible; because the neurological mechanism for the t. n. r. is so deeply entrenched that it does not require cortical controls to the same degree as do more advanced postural reactions. Accordingly, the "reflex" breaks through even when there are competing movements and meager cortical control. If the mechanism for prehension were as deeply entrenched in the central nervous system, the thalamic damage would not prevent occasional manifestations of a complete action pattern of prehension. No such manifestation ever occurred in the life of A. C.

either in periods of relaxation, of excitement, or of purposive endeavor.

This point of view helps to rationalize the t. n. r. phenomenon in so old a child. In spite of his intellectual and emotional capacities, A. C. was never able to bring his t. n. r. apparatus under control by higher centers. Which is a round-about way of saying that voluntary effort cannot command or modulate an action system if certain conduction paths are too gravely impaired. For similar reasons we would suggest that the athetotic movements are not entirely uncontrolled, erratic, aberrant. They are patterned, adaptive, and even integrated within their partial and piecemeal spheres. They are "lawless" only if viewed in terms of a single vertical hierarchy of universal integration.

(c) *Intellectual Abilities.*—The microscopic examination showed relatively few defects in the structure or architecture of the cerebral cortex. None of these lesions, including the necro-biotic mottling, is in itself inconsistent with a normal degree of intelligence. Whether there were ultra microscopic lesions not revealed by the pathological examination remains in doubt, even after a careful clinical study of the patient's mentality.*

The intellectual capacities of A. C. were estimated from time to time over a period of nine years. It is impossible to characterize these capacities by any single formula. As the graph of Fig. 2 indicates, his *adaptive behavior* (*i. e.,* his intelligence and general perceptiveness) at the age of 4½ years, was rated to be near a four year level. This is a fair description of his intellectual maturity, even if no special discount is made for his profound motor deficiencies. His discriminations of form, size, color, number, his attention span, his critical perception of success and failure, his recognition of incongruities and exaggerations, his insight into the meaning of social relationships—all betokened a mind which in its basic orien-

* D. Rothschild has presented evidence showing that in senile psychoses (and in arteriosclerosis) there is a lack of correlation between histologic changes and the degree of intellectual impairment. He attributes the discrepancy to differences in the capacity of different persons to compensate for cerebral damage. It is quite possible that similar factors operate in cerebral damages from birth injury. If so we should rate the compensatory capacity of A. C. as high, by reason of a naturally superior endowment. See American Journal of Psychiatry, Vol. 93, No. 4, 757-784, 1937.

tations approximated modes and even degrees of normality. He could in no sense be clinically classified as feebleminded, if this term is reserved for a generalized subnormal deficiency in mental adaptiveness.

At the age of 13 years the appraisal of the intellectual status of A. C. becomes more difficult. By this time the motor incapacities have taken a cumulative toll; they have taken their earlier toll with compound interest. At a concrete level his verbal comprehension remains relatively normal; he understands conversation about ordinary domestic affairs; but shows limited curiosity about affairs remote; he appreciates verbal incongruities and reacts to them with a sense of humor. But he does not show an abstract interest in words, nor has he demanded silent or loud reading to increase the scope of his information. Verbal auditory imagery is present but probably lacks normal context and support because of extremely meager kinesthetic data. In the management of numbers he makes his best showing when responding to problems about eight horses in eight stalls. (He always was passionately interested in horses.) But he reveals no interest in number concepts nor power of arithmetical abstraction. If it is true that proprioceptive impulses supply the major portion of the energy necessary to normal brain functioning, then we must conclude that in the spheres of symbolic and abstract thinking A. C. at the age of 13 years was seriously deficient. He lacked the ordinary kinesthetic carriers of notions and ideas. He suffered from a form of intellectual reduction due to faulty proprioceptive implementation. In spite of his intellectual poverty, however, he retained modes of thought and a certain perspicacity which clinically were inconsistent with either amentia or dementia.

(d) *Social Behavior and Personality.*—This approximation to a normal as opposed to a "feebleminded" mental organization is most convincingly shown in the field of social and emotional behavior. Here A. C. gives evidence of undergoing a steady progress toward mature levels of functioning. By the age of 13 years he has advanced in his play interests, he has changed progressively in his attitudes toward children and adults; he has shown characteristic preadolescent attitudes toward his mother. In spite of the inevitable dependency inflicted by his handicap, he displayed considerable morale in trying situations. To be sure he also shows traits which

would be regarded as "childish" in an unhandicapped child. But it seems important to stress here those behavior characteristics which prove that his central nervous system was not uniformly arrested by the ischemia which so extensively destroyed the functioning of his tactile-motor system. To a significant degree, even though imperfectly, the potentialities of neurological growth were realized in unimpaired regions of the brain.

§9. General Conclusions.

All this suggests that the tactile-motor elements of experience are not as crucial as is commonly supposed in the developmental mechanics of behavior. They are, of course, indispensible for normal living, but mental content and mental gestalt are not absolutely dependent even on kinesthetic data. The vitality and fullness of the mental life of A. C. were truly remarkable when we consider the paucity and the disfigurement of his kinesthetic experience.

How can we explain this significant approximation to a normal although impoverished realization of mental growth? A thoroughgoing motor theory of psycho-genesis would seem to be inadequate to account for the degree of mental growth which was attained. In many respects the handicap of A. C. was more devastating than that of Helen Keller. And he was denied those experiences in the field of kinesthesia and active touch whereby Helen Keller overcame her sensory defects. He was almost postureless and lacking in the simple postural sets which normally lie at the basis of attention and mental adjustment.

It may be argued that the fullness of A. C.'s development depended upon the intactness of his auditory and particularly his visual functions. Visual experience was probably least affected by his brain injury. His eye grounds were normal and the early internal strabismus was self-corrected. He even attained the ability to make eye movements of a reading type. It is possible that the kinesthetic data furnished by his 12 oculo-motor muscles supplied the main scaffolding for his mental equipment.

These muscles, it may be contended, were able to muster and maintain within themselves a degree of postural set. By such reasoning the motor theory of mental growth can be retained. The argument simply states a) that there is a tendency toward optimal

realization and integration of potentialities; b) this tendency caused the total mental growth complex of A. C. to organize itself about a nucleus of oculo-motor experience. It seems to us, however, that this interpretation strains both the theory and the facts.

How shall we explain the numerous propensities and strivings toward attainments for which this handicapped boy had no equivalent motor realization or even possibility of motor execution? Even at the age of six months, as already noted, he showed an unmistakable propensity to reach for objects. This propensity persisted although it never came within the scope of consummation.

In reviewing his life history one definitely gets the impression that his neurological growth did not altogether depend upon the stimulation of motor experiences. It is because the unimpaired regions of the brain realized such a full measure of their potential growth that he gave no evidence of suffering from a form of secondary amentia. This does not mean that his intellectual life was not impoverished; but it means that he retained a kind of discernment and discriminativeness which were normal in quality.

We infer therefore that the insurance factors of maturation brought about a considerable degree of neurological growth in unimpaired regions of the brain even though these regions are cut off from normal subcortical (tactile-motor) impulses. Such insurance factors enable the organism to some extent to build bricks without straw. It is difficult to think of mental organization apart from tangible (tactile-motor) components. But the new concepts of growth chemistry permit us to believe that the protein molecules of the central nervous system, in a living medium, may undergo considerable elaboration and electro-dynamic organization without the stimulus of patterned motor reactions.

With such concepts the evidences of normality in certain cases of cerebral palsy become less engimatic. There is, after all, no inner necessity why profound motor disability should create or produce an equivalent measure of mental defect.

We draw from all the foregoing the general conclusion that, even in extreme forms of neurologic disability, the patterning of behavior tends toward an optimum of order and organization. Expressed negatively, the deterioration of behavior is not commensurate with the destruction of the primary sensory and motor mechanisms.

The degree of patterned mental growth which takes place after a vascular injury to the brain at birth is not entirely determined by the motor disability itself; but by innate endowment, by the areas of the cerebral cortex unharmed, and possibly by the opportunities for the compensatory development of neuroblasts and neurones. Endowment and compensatory response may well have some interdependence; so that a potentially superior nervous system will be less affected by a lesion than one of lesser grade. For all these reasons natal brain injury results in varying degrees of intellectual and motor impairment. There may be extreme and extensive paralysis without mental deficiency. There may be slight paralysis with extreme mental deficiency. The momentum and limits of mental growth are influenced more by the psychic or symbolic systems than by the sensori-motor, whether cortical or subcortical.

Mental Growth Tends Toward an Optimum Realization.—If the sources of energy on which growth depends are not completely stopped, as they are in profound idiocy, there remains a measure of specific and general potency. This potency expresses itself in the progressive maturation of modalities and dispositions of behavior, even when normal patterns of behavior cannot be consummated. This is the almost irrepressible quality of growth. This is an insurance factor which works toward adjustment and integration even in the gravely handicapped child. Accordingly there is an optimum utilization of impaired instrumentalities and impaired impressions.

Although this principle of development applies to cases of cerebral palsy it does not in itself bake us any bread. The optimum is not always the maximum. It is easy for the victim of cerebral palsy with all its attendant circumstances to become over dependent. From the standpoint of treatment the primary problem is to appraise correctly and to release the patient's potentialities for self directed effort.

§10. Summary.

1. A first detailed study, correlating behavioral data with neuropathologic findings in a case of cerebral palsy is presented.

2. The psychological development and behavior characteristics of A. C. were investigated by repeated observations, cinema records, and a training program, until his death at the age of 14 years.

3. Necropsy showed an uncomplicated lesion of the basal ganglia, of the classic *status marmoratus* type.

4. A tabular summary lists the neuropathological and behavioral findings and brings normal and observed functions into comparison.

5. The cinema records of A. C. at 7, 10 and 13 years were subjected to frame by frame analysis to ascertain evidences of pattern in the apparently erratic movements of his double athetosis.

6. This cinemanalysis revealed temporal and spatial pattern characteristics similar to those of the spontaneous supine activity and the tonic neck reflex of normal infancy. Eleven comparable pattern phases in A. C. and a normal four weeks old infant are identified and delineated.

7. The psychological characteristics of A. C. are interpreted in relation to his autonomic, sensori-motor, intellectual and social behavior. The limitations of motor theories of mental life and of mental growth are pointed out.

8. In spite of the paucity and disfigurement of kinesthetic experience, A. C. showed remarkable integration of personality and significant approximations to normal mentality.

9. Considerable maturation takes place in unimpaired cerebral areas even when they are cut off from normal tactile motor communications.

10. The blemish of behavior patterning is not commensurate with the destruction of the primary sensory and motor mechanisms. Mental growth tends toward an optimum organization.

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DISCUSSION.

DR. BRONSON CROTHERS (Boston, Mass.).—I had a particular interest in this case because I saw the boy at the beginning of this experiment in New Haven, and also one of Dr. Gesell's colleagues, Dr. Elisabeth Lord, has worked with us for many years in the Boston Children's Hospital.

There are two things that are striking, one of which is that Dr. Gesell described a neurological case without knee jerks, or any of the ordinary signs, but laid stress on the developmental importance of these tonic neck reflexes.

We have been able over a period of 15 years to observe a good many of these cases, not with Dr. Gesell's supreme skill in cinemanalysis, but with many reels of moving pictures over a number of years.

We so far have never seen one case showing tonic neck reflexes after early infancy who has ever walked. If that is true, the attempt to elicit indisputable evidence of tonic neck reflexes in disabled children is of far greater importance than it is supposed to be.

The other question, which I hope Dr. Gesell will discuss a little more, is the validity of his observations in the field that is ordinarily thought of as abstract. I do not know exactly how to describe it, but as I understand it, questions which will elicit an answer of yes-or-no are his main method of investigation, and the thing of which it reminds me is the dilemma in which the physician often finds himself, where the mother tells you that the child understands everything that is said.

I have had that experience too many times to feel that it is an easy question to answer, but certainly, in order to convince one that the child's development was at or near a normal stage, I would like to know what kind of questions Dr. Gesell was able to get satisfactory and illuminating yes-or-no answers as the child approached the age of 12 or 14, otherwise it is a little difficult to prove this case about that period, although it was abundantly proved at four and a half, five and six. But the development from then on is rather subtle, and not entirely covered by the abbreviated paper as it was read.

DR. ARNOLD GESELL.—Dr. Crothers' point is well taken. It is discussed at greater length in the original paper. We gave considerable weight to certain observations in situations which we did not ourselves plan, but in which the boy's spontaneous reactions showed discernment and insight. For example, on one occasion when he was "attending" a rural school, the teacher failed to dismiss the group at the regular time. By an increased agitation of movements he called eager attention to the fact that they were running overtime. He could read the clock. So he was made school monitor!

Undoubtedly there was real intellectual impoverishment, because of failure to command spoken and printed language, but we would stress the normal aspects in the quality and the modality of his responses. The steady maturing of his personality and emotional patterns also is significant.

PUERPERAL PSYCHOSES AND THEIR SEQUELLÆ.*

By LOUIS J. KARNOSH, M. D., AND JUSTIN M. HOPE, M. D.,
Cleveland.

In 1848 in Essex, England, at the Lent assizes, a poor woman was tried for the murder of her infant by cutting its throat. All the evidence supported the theory that the defendant suffered with an insanity which came on a few days after delivery. The attending surgeon testified and considered her to be laboring under puerperal mania. It is recorded that his evidence was most straightforward and clear, for undoubtedly he had read the masterful lecture on the subject by Conolly,[1] which had been published two years before. The Lord Chief Justice, who presided, in summing up the case, considered this opinion as very rashly formed and carelessly given. Nonetheless the jury returned a verdict of not guilty on the grounds of insanity.

The editors of *The Lancet* in the crisp fashion of the day took the learned jurist severely to task for the unjust imputations upon the professional ability of the medical witness.[2] It so happened that the judge's own father had been an eminent obstetrician who had written at great length on this very subject of puerperal mania and had particularly stressed the care which is ever to be taken "that the patients in their fits of despondency and rage be prevented from doing mischief to themselves or others." "We specially commend these latter words of his able father to the attention of the Lord Chief Justice," the editors artfully concluded, "for they are sufficient to explain all that seems unintelligible to his legal descendant."

Such sensational and personal tid-bits incidental to the trial were picked up by the lay press, even as they are now, and for a number of years the subject of puerperal mania was one of stirring interest and animated discussion in the coffee-shops and chop-houses of London.

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Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

As a direct result an avalanche of articles on puerperal psychosis descended upon *The Lancet*. Among these one by Webster [3] is noteworthy because it offered some interesting statements respecting the frequency of puerperal insanity. He stated that out of 1091 curable female patients at Bethlem Hospital, an eighth of the whole were puerperal cases, thereby denying the claim of William Hunter that the malady was not a common ailment in England. The same article included the details of one autopsy, the principal morbid alterations being "turgidity of the cerebral vessels and membranes, large, bloody points on cutting the cerebral substance and considerable effusion of fluid in the fifth ventricle."

Another paper emanating from the temporary excitement over the subject hinted that the new practice of chloroform inhalation during childbirth may account for a certain proportion of these mental disturbances.

These historical items are being exhumed to show that in the pre-psychobiological era mental disorders associated with childbirth were respected as a definite clinical entity. This idea persisted even though Marce [4] in 1852 was asserting that such a concept was not justified. Current psychiatry does not look upon these psychoses as a group which merits a clear nosological classification. Rather they are regarded as composite phenomena or resultants of an underlying biogenic weakness, super-imposed psychological stresses, and precipitating toxic and exhaustive factors. According to the findings of Kilpatrick and Tiebout,[5] Frumkes [6] and others, the fundamental features displayed in psychoses following childbirth are in no wise different from those of biogenic psychoses which are not associated with the puerperium, as far as symptomatology and prognosis are concerned.

Two-hundred and thirty-one cases were selected from such sources as the receiving psychopathic hospital, private sanitaria, two maternity hospitals and all general hospitals in the registration area about a large metropolitan center. The incidence of all psychoses associated with child-bearing was first plotted against the curve of the total number of births in the same registration area, to determine whether or not such psychoses were a biologic or organic constancy (Fig. 1). From the findings here, it is obvious that the ratio is a variable one, the chances of a woman's becoming

psychotic from childbirth varying from 1 in 458 to 1 in 1370. The same wide variability is found on referring to various obstetrical texts, such as that of Williams,[7] who notes a ratio of 1:616 and 1:1100, as compiled respectively by Berkley and Jones.

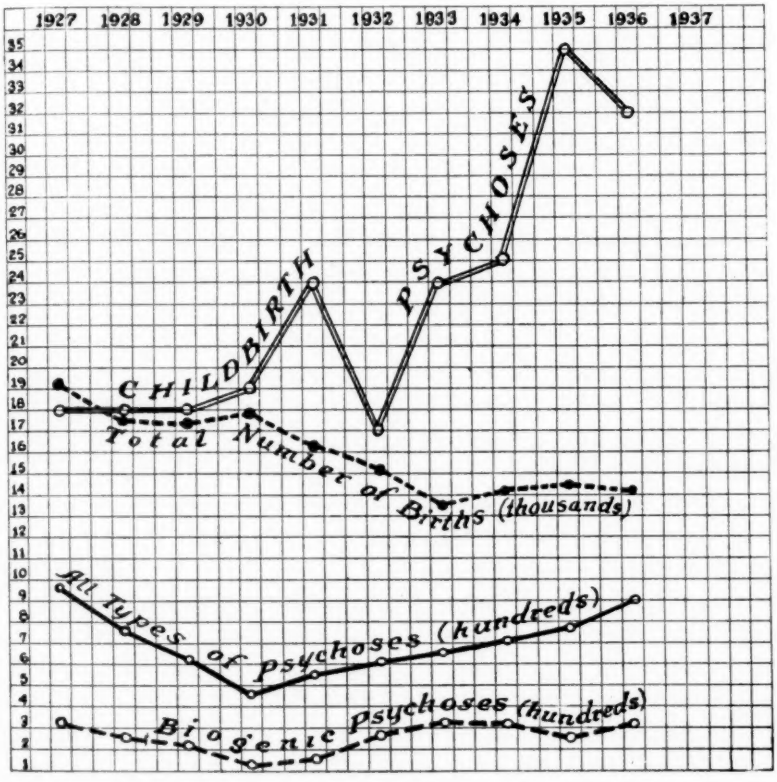


FIG. 1.—The incidence of childbirth psychoses compared with the total number of births in the same registration area over a period of ten years. These psychoses are further compared to the total turn over of new psychoses in the same community, and to the biogenic psychoses over the same admission period. There appears to be no fixed constancy of puerperal psychoses as compared to the birth rate or to the total psychotic population.

This rate of frequency of childbirth psychoses was next plotted against the total turnover of all types of psychoses occurring in the same decade, and also against the curve of the so-called biogenic psychoses. Again the incidence of psychoses associated with

childbirth failed to keep pace with these constituents, for no strict parallel was detected.

What speculation can therefore be allowed to explain this atypical behavior? It can be seen that the number of cases shows a general increase beginning with the year 1931. It becomes necessary to consider extraneous and situational causes, such as the economic stresses of the present time and their immediate and remote effects upon personal and domestic harmony. Such factors have been repeatedly emphasized, particularly in the reports of Saunders [8] and Zilboorg.[9]

This theory is by no means a new one, for ninety years ago Conolly [1] stated that " epochs of national excitement, which exercise an influence on all forms of insanity have been found to make the occurrence of it in the puerperal state more frequent." Esquirol [10] records that in the years 1814 and 1815—years including the invasion of France, the abdication of Napoleon, his return from Elba and his final defeat—the cases of this malady were more frequent than usual in France. That psychoses incidental to childbirth are heavily influenced by situational and psychological tensions can be further confirmed by studying the content of these disturbances where one will readily encounter the familiar elements of hysteria, psychasthenia, anxiety states and other reactive phenomena.

Because there is a wealth of mental phenomena encountered in pregnancy, many observers are of the opinion that the term " puerperal insanity " is too narrow a one and should be discontinued. They believe that the physical and mental ordeals of the pregnancy period are the accumulative forces which are largely responsible for the ensuing psychosis. The data obtained from the group presented does not support this contention. While it is true that pregnancy is often marked by peculiar whims, caprices and sporadic irritability, by and large this period was frequently recalled by the patients themselves and by relatives as one of remarkable complacence. In the vast majority of cases in this series the mental outbreak appeared as a distressing and unexpected complication only after pregnancy was terminated. It is a common observation on the part of obstetricians and family physicians that during the period of pregnancy neurotic women often become more placid,

functional tremors and choreas temporarily disappear, epileptic seizures and periodic headaches are absent and psychoneurotic features are in abeyance. Zilboorg,[11] who elucidated the symbolic material as it is found in the post-partum schizophrenias, states that pregnant women pass through an " orgy of libidinous joy," as they enter the stage of parturition. Zilboorg [9] also reports that only 2 to 23 per cent of all psychoses associated with childbirth occur during the gestation period. This torpor of temperament naturally exists only if pregnancy is not complicated by toxemia, eclampsia, deficiency disease, extreme varicosity or some other physical distress. Such conditions are naturally excluded from this survey.

Of the entire group herein presented, only two patients displayed a frank psychosis during pregnancy which could not be interpreted clearly as an expression of somatic disease. One was an older primipara who became pregnant as an accidental feature of an already established manic phase, promptly entered a depression on being apprized of her condition and who continued in this state through labor, puerperium and the entire lactation period. She did not recover until a year after her delivery. The second patient was a case of frequently recurring mania who maintained this condition throughout pregnancy, delivered spontaneously, and continued in wild psychomotor exultation for many months after childbirth. In neither case did the events associated with labor, involution of the uterus and lactation make any impress upon the already established psychosis.

It appears, therefore, that no matter how threatening or potent may be the anxieties and eccentricities of the pregnancy period, a true psychosis rarely supervenes before delivery occurs, before involution of the reproductive organs enters into the picture and the process of lactation begins.

The stormiest psychoses associated with child-bearing develop in the period immediately after delivery. Strictly speaking, the onset occurs not at the beginning of the puerperium but coincides more accurately with the appearance of lactation. With the exception of two cases in this entire series—and these women were chronic alcoholics—no patient displayed a frank psychosis until the third day or thereafter. There is, therefore, a definite latent

or incubation period, frequently the mental symptoms appearing on the same day as the onset of lactation.

By far the most common denominator in these acute puerperal psychoses is a delirium; the more abrupt the onset the more profound is the clouding of the sensorium (Fig. 2). In 24 per cent of the patients in this study, this was the dominant component, the peak of its incidence occurring about the sixth post-partum day. This is an average incubation period of considerably shorter dura-

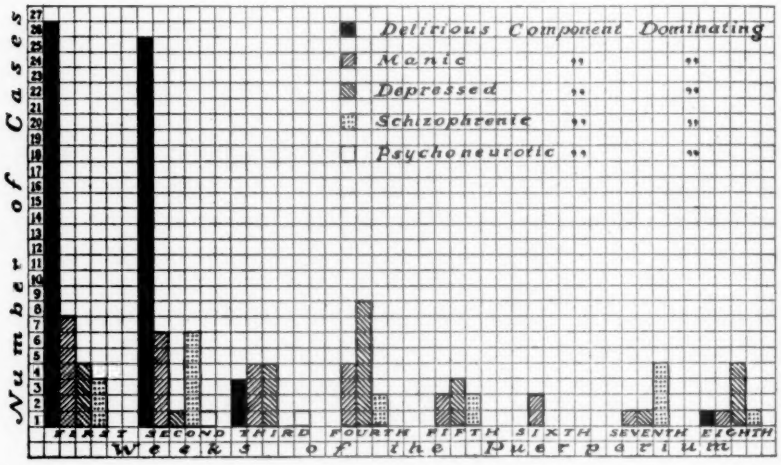


FIG. 2.—The distribution of puerperal psychoses in reference to incubation period and to quality of psychoses. Most of the episodes of the first four weeks contained a delirious component, but only those which manifested this element, to the exclusion of other psychotic features, are indicated as being of the delirious type.

tion than that reported by Strecker and Ebaugh [12] which was 22 days for the toxic-delirious types.

The delirium was of varying intensity and was often intermingled with other psychotic elements which were brought into being almost at the same time. It should be stated that most of the acute manias, many of the schizophrenic outbursts and a few of the depressed types contained a delirious element in the earlier phases but are not so recorded. Not only did Strecker and Ebaugh report 34 per cent as being of the purely toxic-delirious type, but over 77 per cent of their manic group were qualified as having a clouded sensorium. Panic, confusion, sudden aversion to and dis-

trust of relatives, misidentification, hallucinosis, sing-song jargon and disintegration of normal affect together with a rapid pulse, tremor, quick dehydration and a fever ranging from 99° to 102° were the most constant features and are familiar to every observer.

This acute picture was such a clinical melange that it was rarely possible to make any accurate predictions as to the outcome. Only when the delirious features subsided did the concomitant biogenic elements emerge clearly enough to be recognized, if they were present at all.

Eventualities which appeared when the element of delirium abated can be briefly presented as follows:

(a) Delirium followed by quick recovery or death.

(b) Delirium followed by a manic phase and recovery.

(c) Delirium followed by a depressed phase, with recovery or a chronic depression.

(d) Delirium followed by a schizophrenic psychosis with only an occasional recovery.

That true delirium may exist in these patients without specific infection or a clearly defined toxic agent was confirmed in two necropsy studies. In both of these cases typical "wet brains" were found, one brain weighing 1400 grams and the other 1225 grams, these findings being associated with the familiar picture of acute cloudy swelling in all the parenchymatous organs.

Microscopic section studies on the brain of one of these cases revealed nothing beyond an increase in the size of the subpial spaces, as indicative of œdema, and an abnormally thin ependymal lining. Sections through the second brain revealed an increased number of micro- and macro-glial cells. The glial tissue under the meninges was frayed and œdematous, and the larger nerve cells were œdematous. Sections through the medulla showed severe granularity, loss of staining property and in many instances loss of nuclei of the larger motor cells. In addition the glial tissue of the medulla was frayed and œdematous. Sections through the cerebellum revealed no significant abnormality. While some of these interpretations are open to question and the changes may be within the realm of artefact, the excessive glial proliferation is a significant pathologic finding.

What is the delirium-producing factor in this period? Obviously it is one feature of psychoses associated with child-bearing where

toxic or endogenous processes must be considered, and which cannot be explained away on the basis of psychological conflict or even on constitutional deficiency. So far no specific mechanism can be demonstrated.

Endocrine disturbances have been suggested as a cause, although Saunders [8] and other workers found no evidence to sustain this belief.

Hormone assays, such as are available at the present time, are extremely difficult to carry out on patients who are suffering with acute mental disturbance. In this series it was possible to obtain prolan estimations on 10 women in the first 10 days of the puerperium and quantitative estrin assays on six. In every instance the results were low, readings which do not, however, differ from those of normal, non-psychotic women in the same phase of the puerperium. It should be recalled that the action of the lactogenic hormone is inhibited in part during pregnancy by high estrin content in the blood. It can act only after the mammary tissue has been prepared by the estrin and the latter has been reduced to a minimum. The action of prolactin is solely to initiate and excite milk secretion.

Acting upon the suggestion of Anselmino and Hoffmann,[13] the use of anti-galactogogue principals such as antuitrin-S and theelin have been given in 20 cases to terminate lactation. This method has been no less successful than the administration of salines and breast compression in inducing rapid delactation, but it is doubtful whether either method had any direct influence on abating the delirium.

Apparently the delirium-producing factor initiates its effects before or just at the beginning of lactation. In its intensity and sudden onset puerperal delirium resembles the thyroid crisis which follows upon an operation for toxic goiter, and which, according to Dinsmore and Crile,[14] may be due to acute failure of the glycogen stores in the liver.

Because the toxic or delirium-inducing factor is so sharply limited to a definite portion of the puerperium, because its time relationship to lactation is so suggestive, because it cuts across all personality types either to cause sudden death, to disappear, or to precipitate into active state certain biogenic mental distortions,

one should keep an open mind to the possibility of a specific endocrine or other endogenous crisis.

Smith and Smith [15] have already demonstrated that a disturbance in the estrin-prolan ratio in late pregnancy may be a sign of impending toxemia. The complete mechanism by which the lactogenic hormone is released, the reason for its lack of action during pregnancy, the rôle of the liver, pancreas and parathyroids in milk production and other topics in lactation are, as yet, not definitely understood. As long as this state of our knowledge of the subject obtains, it is untimely to state that the endocrines are not a factor in the production of post-partum mental disease.

It is no cheap empiricism or shallow rationalization which is frequently heard by psychiatrists that many women "have not been the same since the birth of the last child." The many mild post-puerperal regressions, insidious disintegrations of personality and chronic psychoneurotic distortions which occur after several puerperal episodes can never be accurately evaluated, for rarely do they come to the attention of psychiatrists, or the longitudinal story is not accurately revealed. The post-puerperal destinies of those who have had a major puerperal upset can be more clearly presented.

Many psychoses do not appear until after the puerperal period has passed. These delayed or more insidious disorders are popularly called lactation psychoses. In this series these belated upsets were chiefly schizophrenic, melancholic and psychoneurotic states and showed every evidence that constitutional and situational causes were dominant. The delirious component was notably lacking.

Life curves of a few types of puerperal psychosis, particularly the manic-depressive, the delirious, who are ordinarily regarded as recoverable cases, and a few out of the schizophrenic group, illustrate the post-puerperal and more remote events which ensued once a delirious puerperal psychosis had been experienced.

The Manic Type.—The post-puerperal record of 11 cases of puerperal mania are shown in Fig. 3. Most of these individuals can be called syntonic as to pre-psychotic temperament, a large number being Jewish. The acute puerperal attack was almost always of a delirious-manic variety. The subsequent history revealed a definite exaggeration of the cyclothymic trend with frequent episodes of manic-depressive psychosis, even though no later preg-

nancies occurred. Many of these recurring attacks were severe enough to justify re-admission to a psychiatric hospital. Apparently the toxic-manic illness in the puerperium induced an organic change which thereafter expressed itself in the form of a more exaggerated cyclothymic disposition.

The Simple Delirious Type.—Psychobiologic studies revealed that in this group hereditary taint was minimal and the pre-psychotic personality was interpreted as being the least unstable. The same

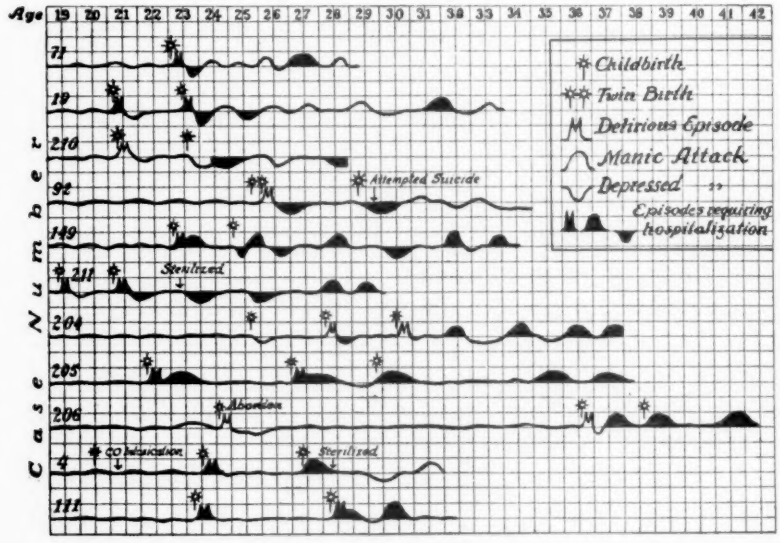


FIG. 3.—A chronological scheme illustrating the further course of events which occurred in eleven women where primary psychosis was a puerperal delirious mania. It appears that these acute delirious psychoses produced in these patients a pathological cyclothymia marked by frequent manic depressive episodes. In none of them was there demonstrated a major psychosis prior to the puerperal delirium.

impression of these purely delirious types was expressed by Strecker and Ebaugh.[12] Three of these died in the delirious state, necropsies for two of which were described above, while the rest recovered after a short convalescent period. Five of these were under scrutiny over a period long enough to make possible a record of the subsequent mental course (Fig. 4A). Not only does this group show a tendency to duplicate the delirium after subsequent pregnancies, but the same reaction may follow on the heels

of an acute infection or slight head trauma. Hence one can theorize that these individuals have a ready diathesis to benign delirium and we can term them " deliroid " in the same sense as we use the term schizoid or cycloid.

The Schizophrenic Types.—The most protracted, most severe and utterly tragic events in the wake of an acute puerperal psychosis occur in the so-called schizophrenic group, particularly when the ancestral record is positive for mental disease. Seventy-one per

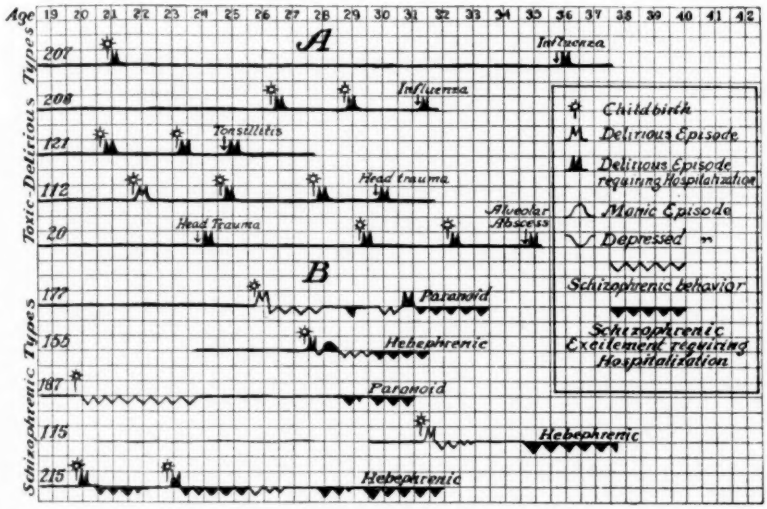


FIG. 4A.—A chronological scheme demonstrating the diathesis to pure delirium in five patients whose life curves are not modified by any other biogenic disturbance. In these patients there is no evidence of serious distortion of pre-psychotic temperament, and recovery is the rule.

FIG. 4B.—A sampling of the longitudinal course of the schizophrenic type of puerperal psychoses. Following an initial puerperal delirium there emerges the erratic and irregular behavior pattern which usually culminates in regression or chronic paranoid deterioration.

cent of these failed to rally from the original upheaval and continued to show the disjointed behavior characteristic of dementia præcox. Prominent in this degenerative picture was found a trend toward regression into infantile and immature mental and emotional behavior, which is characteristic of hebephrenia. In this group the greater percentage obviously remained under institutional management (Fig. 4B). Those showing the milder hebe-

phrenic residues were intermittently allowed their freedom. Exacerbations in the form of catatonic excitement, silly unpredictable behavior, inability to assume the simplest domestic responsibilities, were reasons frequently given for reincarceration. In this group occurred two infanticides and one homicide.

SUMMARY.

1. The assembling of statistical data on psychoses associated with childbirth appears to show that their frequency is heavily influenced by situational and social factors. These psychoses do not appear to be of fixed constancy in relation to the total number of births in the community or to the biogenic psychoses in the population.

2. The only consistent or characteristic element in true postpartum psychoses is delirium, which appears in varying intensity. No specific endogenous or exogenous factor is revealed, although complex endocrine imbalance cannot be definitely eliminated at this time.

3. In women of cyclothymic disposition a delirious mania following childbirth may lead to an increased frequency and an easier tendency to manic-depressive cycling, even though subsequent pregnancies do not occur.

4. The purely delirious types which recover rapidly are individuals who are generally of stable pre-psychotic matrix. However, subsequent attacks of delirium occur in some, which indicate a low threshold to this type of psychosis and to no other.

5. The most persistent and tragic residues are found in those women whose personality structure is in the schizothymic direction and whose inheritance is tainted. Here the outstanding trend is to hebephrenic regression.

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DISCUSSION.

DR. JOHN P. POWERS (Boston, Mass.).—I am not in accord with some of the statements of Drs. Karnosh and Hope. I do not believe there is a true puerperal psychosis. I believe psychoses following delivery are ordinary psychoses which would be found with or without childbirth.

Furthermore, I consider the delirium to be the same as that found in any condition. I feel the necessity for further proof of a connecting factor between the delivery and the psychosis before I accept the term, "puerperal psychosis."

In this paper it was stated that the term should be discontinued, and with this suggestion I agree.

In the practice of medicine we must be careful to refrain from arguing that because there was a delivery, the resulting psychosis is due entirely to it. I am inclined to think that the resulting psychosis is due to a break in a manic-depressive, or paranoid temperament, due to some other factor than the pregnancy itself.

If it is possible to make a diagnosis of any one of these conditions as a post-puerperal case, without knowledge of or information proving that there has been a childbirth in a particular patient, anyone making the diagnosis of a post-puerperal psychosis is bound to be on the defensive.

In 3250 autopsies done by the Department of Mental Diseases, only three were listed as post-puerperal. Probably others are lost in the toxic-infectious group or are classed as dementia præcox. In the cases so diag-

nosed these pathological conditions were bound to explain the psychosis: In the first, multiple cardiac thrombi, embolism, contributory edema and hydrothorax. Final diagnosis: Psychosis with other somatic disease.

Second: Acute and chronic endocarditis, contributory cerebral thrombosis.

Third: Pulmonary thrombosis, contributory infarct.

DR. ERWIN WEXBERG (New Orleans, La.).—May I ask the doctor whether the basal metabolic rate has been determined in these cases?

DR. KARNOSH.—No, just in a few cases where we believed it was indicated. No basal metabolism is possible in excited cases.

DEVELOPMENT OF FAMILY CARE IN NEW YORK STATE.*

By HIRAM G. HUBBELL,
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Family care of mental defectives has been in operation at the Newark State School since 1931, a period of six years.

A system of extra-mural care has been in operation for a number of years, but only for the higher grade of patients. We have colony houses where patients go for training in domestic work for the girls, and farm work for the boys. They go out to work by the day, and return at night to the custody of the matron in charge of the colony. After sufficient training, they are placed on parole to the custody of their employers, but still under the supervision of the institution. Another group have returned to their families or communities upon parole.

This left a large number of patients, who could never be self-supporting, were not trainable, or because of physical defect, would never be able to support themselves. A great many of these require only a moderate amount of supervision, but have been gradually filling up the institution, and restricting the number who could be admitted for intensive training.

We have been very much impressed by the type of family care given abroad to psychiatric cases who need only a moderate amount of supervision, especially at the colony at Gheel; and we have felt for a long time that a great many of our cases could be placed to advantage under this type of care. Also, we have many children in the school sent to us through no fault of their own, but because of broken homes, insufficient or careless supervision, etc. If they were to remain in the school, they would gradually become institutionalized, and perhaps a great many of them would remain for the remainder of their lives. We have felt that a great many of them should not be deprived of an opportunity to grow up in the community outside of an institution, and in August, 1931, we began

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placing a few children in boarding homes in nearby villages where they could attend school and mingle with normal children. By January, 1933, six children had been placed satisfactorily.

At this time, we began to think of placing adult patients, who would never be self-supporting, in families where they would be well taken care of, and given a slight amount of supervision, and live in a more normal manner. Realizing that if we were to carry out this idea in an extended manner, it would be essential that they be placed, generally, in a small community where it would be possible for the physicians and social workers to supervise them closely, we decided upon the Village of Walworth, a small town of about 300, located 16 miles from our institution. This village is located away from the main thoroughfare, four miles from a railroad, the residents being very high type citizens. We, therefore, contacted the local physician, who recommended several homes, and in the first home investigated we were very fortunate in finding a boarding mother who had a fairly large home and who, at once, became very much interested in the project. She was also a practical nurse. On January 9, 1933, two women, one 49, and the other 50 years of age were placed in this home, and at the same time two others were placed in a nearby home. This woman, because of her knowledge of the residents and suitable homes, was a great help to us in placing additional patients. The numbers increased, and we began to find it very essential to have a community center where patients could assemble for social gatherings, for interviews and inspection, and where clothing, medical supplies etc., could be left for distribution. We decided upon the home of the first boarding mother, who was then placed on a regular attendant's salary, and who, in return, agreed to provide a community center room in her home where patients could be left if their boarding mothers wished to go away for a day, or where they could be brought in case of minor illness. Two beds were provided in this home. Our occupational therapist attends at this community center at frequent intervals to provide various forms of occupation, recreation and social gatherings for the patients. The boarding mother also looks after the general health and welfare, and reports anything that needs the particular attention of the school. She cuts their hair, trims their nails, etc., and acts as general over-

seer, keeping in close contact with our social worker, who has charge of this group under the clinical director.

The project has grown to such an extent that it requires the undivided time and attention of one social worker, who investigates all homes before the patient is sent out, and recommends to the physicians suitable cases for family care.

As a rule, we place only two individuals in each home, as we believe in this way they receive more individual attention from their boarding mothers, and are made members of the family. In cases with a physical disorder, such as blindness, or a crippled condition, we have placed four in a family in order that two healthy patients may help to look after the two others, helping them in dressing and getting about from place to place.

At first the residents of the town were rather disinclined to receive patients in their community, as they felt that the patients were peculiar or insane, and would be a menace to the town; but as more and more have been placed and they go about the streets causing no trouble, we have been having more applications for homes than we can fill. All the patients do not reside within the village limits but many are placed on nearby farms where they are able to get to the community center from time to time. In general, the people of the village have shown a very sympathetic attitude toward them, and have given them many privileges. They attend church, various social gatherings, and are often provided with tickets to entertainments in the village.

We have divided this project into three groups as follows: family care—community; family care—school; family care—individual. In our community group at the present time, we have 88 patients whose average age on admission to the school was 27 years with an average length of residence in the institution of about 20 years. The average intelligence quotient of these cases is 47.5. We find that women are much more adaptable to the community home than men, although we have several boys in our school group.

The next group, family care—school, is made up entirely of children of school age. From the first, we have felt that it would not be wise to place children in our community group of older patients, but decided to place them wherever a good home could be obtained, and where they would have adequate school facilities.

We are intensely interested in this group for we feel that a great deal can be done to rehabilitate them, and avoid making them life-long institutional cases.

At the present time, we have placed 28 in 18 homes in surrounding villages and school districts. We have found that the most satisfactory age is from 6 to 12, although we have placed a few at the age of 14. We prefer to start them as young as possible. Their intelligence quotients range from 47 to 86 with an average of 62. Twenty attend grade school, 6 district school, 1 parochial school, and 1 is too young to enter school until this fall.

Previous to coming to the school, a number of the children had been tried in various boarding homes, and shifted about from place to place because they did not make progress in school, or the boarding mother had other normal children and did not wish to be bothered with them. However, in almost every case, they have adjusted well in the homes that we have provided, and for the most part are doing surprisingly good work in school.

To illustrate the progress made in this type of care, I should like to quote from the records of a few cases.

C. V., female, age 12 upon admission to the institution in 1930, mental age 7 years 2 months, I. Q. 59, was placed in boarding home in October, 1931, where she made excellent progress in school, took a great deal of pride in her work, both at home and in school. She was started in the third grade, was soon promoted to the fourth, and was able to do all the fifth grade work, except arithmetic. She showed a great deal of interest in helping to care for other children, and thought she would like to be a child's nurse. During the summer of 1935, we were able to provide her a position in a private institution for children where she received instruction in their care. At this time, she had passed to the sixth grade with good marks. Following this, she was placed in another home where she was promoted to the seventh grade in another school, and the following month was advanced to the eighth grade. Her boarding mother taught her housekeeping and cooking. Now, at the age of 19, we are planning to get work for her in an orphanage or hospital, and she is making her plans to enter a school of practical nursing when she reaches 21.

E. V., female, admitted October 7, 1931, at the age of 12, I. Q. 63, was placed in a boarding home October 5, 1933, with a history of temper tantrums upon the slightest provocation, screaming and yelling and abusing other children by slapping them and pulling their hair; had been in various boarding homes from the time of her birth until no one would have her, and she was placed in a home for children. After going to our boarding home, she was placed in the fifth grade in school. At first, she was impudent, careless in her habits and cried easily. At the present time, at the age of 18, she is in the

eighth grade in school with reports as follows: history 83, spelling 95, English 76, arithmetic 64, civics 64, reading 91, designing 80, average 77.1. There is a marked improvement in her personality. She no longer shows temper tantrums, is pleasant and agreeable, and has been made president of her class. Wants to be a nurse, and some arrangement will be made for her to care for children or take a course in practical nursing.

J. W., female, admitted July 24, 1933, at the age of 12 years 5 months, mental age 9 years 7 months, I. Q. 76. She had been sent because the father was immoral with the children, and the home had been broken up. She had been placed in several boarding homes previous to admission where she was no real problem, except that she was lazy, slovenly and disobedient. She had reached the fourth grade in school. We placed her in boarding home in September, 1933. At first she was rather irritable and quarrelsome but by December of the same year, she was noted as getting on splendidly in school, and was an honor student. Her conduct improved. She has become more ambitious, and has now started in the eighth grade where her last marks were: history 80, arithmetic 85, spelling 75, English 60, reading 60, civics 73, designing 80. She wants to go through high school.

Another child, admitted in 1931 at the age of 12 with an I. Q. of 49 was placed in a boarding home in October, 1933. While she has been unable to progress beyond the opportunity class, she has a very nice personality, is well liked, has sung in the church choir for a long time, and as she is now 18 years of age, she has been taken out of school, and placed in another boarding home where she earns her board and 50 cents per week while being trained in domestic work.

One small child does not like to talk to the social worker upon her visits, as she fears she may be returned to her own home.

Eleven of our girls have joined the Girl Scouts. All attend church and Sunday school.

In one home, we tried placing a small boy and girl, and this has worked out very well.

We were able to place a little colored boy in a colored home where he goes to school with the boarding mother's boy.

The children are in the following grades at school:

1 too young to attend school.
2 in kindergarten.
4 in special class.
4 in first grade.
2 in second grade.
6 in third grade.
2 in fourth grade.
3 in fifth grade.
1 in seventh grade.
3 in eighth grade, the latter taking some first year high school subjects.

We have never made any attempt to influence the placement of children in school, but if requested, we furnish the I. Q.

Taking up our third group in family care—that of individual cases, we found that several of our patients who had formerly sat about the institution with no interests whatever, and making no effort to do anything for themselves, had become more alert after going to boarding homes, and were able to do enough work in the families to pay for their board and lodging. These were removed from the community and placed in families who wanted a little help but were unable to pay standard wages. These cases receive excellent care and supervision, and get 50 cents or more for spending money. One case was advanced by her boarding mother to $2 per week. These, of course, are no longer any expense to the state. Up to January 1, 1937, we have placed a total of 202 cases, 80 having been returned for various reasons, leaving 122. Eighteen were returned during the year of 1936 for the following reasons: 8 were ill, 7 unadjusted, 1 paroled to relatives, 1 discharged, and 1 for employment.

We now come to the more practical or economic side of the question. From a sociological point of view, there is no question that these patients are happier in living a more normal life, and the children are gaining in normal contacts, something which they would never get in an institution.

In the beginning it was extremely hard to get money for this project, as it was something new and the legislature had approved no funds for it. However, we began by paying $4 each for our community cases, and $6 for children. This money we were able to obtain chiefly from our colony funds. During the year beginning July 1, 1935, the legislature appropriated $20,000 for the hospitals and schools in the State of New York under the Department of Mental Hygiene, restricted to a payment of $4 per week per inmate in family care. We have never been able to board children for less than $6, for the reason that they require more care, and are chiefly located in the larger villages where the expenses are higher, so that we were obliged to make up the extra $2 from our colony funds.

We then contacted the various county welfare departments, who had sent children to us, requesting them to pay the extra $2 which the state did not provide, and pointing out to them that these

children were able to get along outside the institution, and that if they were willing to help out to this extent, we would continue the children in our family care, or otherwise return them to their counties. We received a very encouraging response to this, and many counties are now making up the difference between what the state allows, and what is required to board the child.

Our allotted money was used up at once, and the legislature has now allotted an additional $40,000 for this school, and $30,000 to the other institutions under the Department of Mental Hygiene beginning in July of this year, and will allow payments on an adjusted scale, so that we will not be held entirely to the weekly $4 rate.

As a result of the appropriation of funds by the state, the family care of patients has been started in most of the psychiatric hospitals of the state, as well as schools under the Department of Mental Hygiene. By September 1, 1936, 283 psychiatric cases had been placed from the various state hospitals, while 426 had been placed from the state schools for mental defectives.

Quoting from Dr. Vaux' report in "Family Care of Mental Patients" by Dr. Pollock; "The combined weekly per capita cost of the two groups is $5.21. If we add the third group, individual, which is just as directly a part and product of our family care movement, we have $4.82. Combining only the last two groups gives us the figures for adults as $4.17. Thus, all the figures are below the per capita for the institution—$5.95."

This shows quite conclusively that from a financial point of view, it is cheaper to care for these cases outside than in the institutions.

DISCUSSION.

Miss Hester B. Crutcher (Social Service Department, N. Y. State Department of Mental Hygiene).—Dr. Hubbell gave an interesting picture of placing patients, as carried on at the Newark State School, but as his paper is on placing patients in family care by the New York State Department of Mental Hygiene, I shall supplement his paper to a brief extent.

April 1, 1937, 311 patients had been placed in family care from 13 different state hospitals; the state hospitals around the metropolitan area of Greater New York have not participated in this family care for the reason that there is no rural community in which to place patients. 167 patients had been placed out by 4 different state schools. Incidentally 105 of these patients were from Newark, so you realize the important part Newark has played in the development of the family care.

In the state hospitals home care is used in three different ways. I am not giving them in the way which is the most important. First, as a therapeutic measure; some of the hospitals have placed patients out in the hope that they will improve enough to be placed on parole or pending parole plans. This is perhaps where there is an antagonistic family relationship or where an adolescent couldn't possibly go back to the family because of dependency or something of that sort. The patients have gratified the hope of the hospital authorities by improving to an extent in this therapeutic family care.

Then there is one hospital that has placed out patients who worked well in the hospital but who required such an amount of supervision that it was felt they couldn't be placed on parole. So they were placed on what was called working family care. They supported themselves, but it was regarded as family care because they had to have the close supervision that the patients in family care had.

The third, and by far the largest group, are the custodial cases that have been placed out. They are patients who are not dangerous to others; they are not in need of special medical treatment that is not obtainable in a home, and they are not too disturbing factors in that home.

As Dr. Hubbell has said with the defectives, so with the mentally ill, the patients are placed out chiefly in rural communities, frequently around small towns where it is hoped that a center can be developed, somewhat similar to the one at Walworth. The patients have entered into the simple life of the community, their recreation being chiefly the family life, the church and shopping. Incidentally, our patients have been given 25 cents a week spending money, some of them only 15 cents a week. One woman who had been in the hospital 35 years, saved up her 15 cents a week for two weeks to buy herself a pair of silk stockings which we thought was indicative at least of a better community adjustment.

In the first 15 months that we have tried this (and incidentally the placing out of patients in family care in the state hospitals began July 1, 1935), 466 patients were placed out; 156 had been returned to the hospitals, 49 replaced; 35 had gone on parole and 3 had been discharged. If you compare these figures with the figures of child placing agencies, I think you will find that there is not a particularly high turnover of patients. The reasons for the return have been that the patient became physically ill or the home seemed unsatisfactory for various reasons, and failure to adjust.

As Dr. Hubbell said, we pay $4 a week, which has not enabled us to develop that rapidly, because even in rural New York it is hard to find a sufficient number of satisfactory homes at $4 a week. July 1 of this year, we will be able to raise it to $6 a week, and we hope that it will develop more rapidly than in the past.

It is interesting to see the effect this seems to have on patients. You put out a patient who scarcely talks at all and just sort of sits and has to be led to the table and helped to do this and that, and six months later you call at that home and the patient will carry on a conversation with you. Last summer I visited a patient and they thought it was quite remarkable because she pulled the rug over on the porch for me to sit on. I was out a month ago to

see the patient and she chatted with me, not a rapid fire conversation, but she talked in an amiable, social way.

Dr. Hubbell spoke of placing children in family care. The Department of Mental Hygiene does not regard itself as a child placing agency, but we had rather an anomalous situation when we had the tendency to place children in foster homes and discontinue large orphanages, the children who were dull or defective were hastily shunted into an institution, so we had quite a number of children coming into the institutions who perhaps wouldn't profit particularly by the training in an institution. We wanted to show to the county welfare officers, to the county commissioners or the county child welfare board that these children were amenable to foster home placement, just as the normal child was, and we regard that more or less as a demonstration to the various communities of what can be done with the defective child.

Another point that Dr. Hubbell brought up was that the men didn't seem to adjust so well in home care. That is quite the opposite in the state hospitals. The men patients from the state hospital adjust very well indeed, in our experience. Often people express a preference for men.

Newark has only been a co-educational institution for the last two or three years, and perhaps the men haven't been there long enough to learn to accept authority and be as amenable as the girls or the older women who are placed in family care. I think that would be an interesting thing for Dr. Hubbell to develop.

In discussing the cases which Dr. Hubbell has presented, one gets the impression that there is a great deal of pressure put on these children for academic achievement. In visiting these homes, as I have—one does not feel that that pressure is placed on the children, but an attempt is made to find the thing in which they can be successful and let them find success in that and develop along that line.

I wish that Dr. Hubbell had had further time to interpret his cases so they wouldn't sound quite so much as though a miracle had occurred. An excellent job has been done. The patients, to quote other people who visited them, seem to get brighter in family care. By that we do not mean that they develop a genius of an Einstein, but they do become more individualized and more alert and more responsive. It seems to me that regardless of the financial saving which we hope placing the custodial type of patient will be to the state, there is something far more valuable, that is the conservation of human values.

MENTAL REACTIONS AND THEIR MANAGEMENT IN PATIENTS WITH CARDIAC DISEASE.*

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In recent years the attention of many writers has been directed toward the psychiatric aspects of the care of patients whose chief complaints have been related to somatic diseases, and this has been particularly noticeable in relation to diseases of the cardio-vascular system. The significance of the part played by anxiety in aggravating and prolonging the incapacity of the individual, and the remedial effects of psychiatric treatment have been pointed out. The value of such contributions is apparent, and it is not the purpose of this paper to discuss the subject from this viewpoint. It is planned instead to speak of the more severe mental reactions associated with cardiac disease, that is, the phenomenon frequently referred to as "cardiac delirium." Some of the literature is to be reviewed, and a study of ten patients whose mental illnesses associated with cardiac disease brought them to a psychiatric hospital for treatment will be presented. It is hoped that some contribution will be made to a better understanding of such patients, and in turn, to their better management.

The delirium associated with cardiac disease has been recognized for many years, and almost any comprehensive textbook in either medicine or psychiatry mentions it. Thomas Watson, in lectures given in 1836, referred not only to the apprehension of the cardiac, but said: "There is a propensity to dreaming, and especially to distressful and frightening dreams . . . . and sudden starting from sleep in horror and alarm." [1] Many other writers of the nineteenth century referred to these reactions,[2, 3, 4] one of them being Austin Flint, who said: "These symptoms are apt to mask the cardiac disease, and lead the practitioner to suspect disease of the brain." [4] The incidence has been variously estimated, some authors saying that it is rare,[9, 15] and others estimating that some symptoms

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of a delirious nature are present in about 10 per cent of all cardiac patients in whom the disease is sufficiently advanced to require hospitalization.[14] Our own experience inclines us to believe that the latter figure is more accurate.

Many theories have been advanced in explanation of the mental symptoms in such cases. Watson felt that the difficulty was due to a disturbance of circulation in the brain,[1] and this view has been supported by some of the more recent writers. Curtin in 1905,[5] Auban and Beurnier in 1909,[6] and Riesman[7] in 1921, are among those who have held this view. Curtin felt that the disturbance of cerebral circulation might be manifested as an arterial, venous or capillary congestion, or as a cerebral anemia.[5] Henry Head, in a comprehensive paper written in 1901, said: "A disturbed activity of the heart may alter the circulation to the brain or may change the character of the blood with which it is supplied. The delirium that accompanies a failing heart or pronounced vascular degeneration may be instanced as an example of a mental change dependent directly on altered vascular conditions."[10] Another theory is that cerebral arteriosclerosis may have a great deal to do with the appearance of mental symptoms.[8] The majority of the writers on the subject have commented upon the fact that most of the patients are over 40 years of age; and even where the sclerosis is not demonstrable, it has been suggested that there is a beginning process of senescence.[9] Other causes that have been suggested are "drugs and poisons,"[7, 8] carbon dioxide poisoning, faulty metabolism, strain on the nervous system from insomnia and the constant struggle for breath, dread of death,[5] uremia, acidosis,[7] and some unknown "toxic factor." Head, speaking of patients who had had transient delirious symptoms, offered the theory that reflected visceral pain was responsible for the delusions and hallucinations.[10] Some of the earlier writers held the theory that the location of the cardiac lesion determined the type of mental reaction. For example, Flint thought that indifference alternating with excitement and terror were most apt to occur in pericarditis, while imperfect sleep disturbed by frightful dreams was characteristic of valvular disease.[4] Curtin speaks of the belief that "the aortic cases are those of the excited types, and the mitral ones the depressed."[5] However, it is generally agreed at the present time that severe mental symptoms may be associated with

any type of heart disease, and that the mental symptoms do not bear any specific relation to the location of the cardiac lesion.[7, 9, 14]

The question of digitalis poisoning as a cause of the delirium deserves special attention, since this is brought up from time to time even today. In 1874, Duroziez advanced the theory that the mental symptoms were brought about by digitalis, and discussed 20 patients in whom delirium had appeared after digitalis had been started.[3, 12] Hall, in this country, expressed the same idea in 1901, but said even then that the majority of physicians did not consider the drug responsible.[12] Carr (1921) thought that digitalis acted as an additional toxic factor at times,[13] and in the same year Macht demonstrated that the various digitalis bodies produced a depression in the behavior of rats in the circular maze.[11] The experience of more recent writers does not confirm this theory,[7, 14] and we have found in our own series of cases in a mental hospital that adequate digitalization, by restoring compensation, is of definite benefit. It is possible that digitalis that had not been properly purified, and which was not standardized, might produce toxic symptoms either by direct action upon the central nervous system, or indirectly by allowing decompensation to increase, but with the present standardized preparations this should not occur.

Psychiatrists have frequently called attention to the fact that in addition to the physical effect of somatic phenomena such as disease or childbirth, one must also consider the psychological significance of these conditions. For example, what does cardiac disease mean to the individual? Everyone understands that the heart is a most vital organ, and when it is diseased it not only produces a physical incapacity, but may also contribute to the undermining of the spirit and morale of the individual. This very factor may be responsible to a large extent in the lowering of mental resistance and serve as a strong factor in producing mental disease. Although this point is mentioned occasionally in the literature, especially as regards the anxiety found in heart disease,[5, 16, 17] it would appear to be deserving of more attention. In most instances, the heart disease develops slowly, and the intelligent patient recognizes the seriousness of his condition. There is first the fear and dislike of being dependent upon others, and next the fear of death, as well as the constant sense of physical distress.

Another point which has not received sufficient attention in the literature is that of the personality of these patients. Riesman said: "The particular state of mind is closely related to the patient's temperamental make-up and to his philosophy of life," and commented on the fact that some patients with heart disease displayed an unusual patience and placidity even until the time of death, while others showed varying degrees of emotional instability.[7] It is recognized that the vast majority of patients with heart disease do not develop psychotic symptoms, and this has led some to believe that persons with different types of psychological tendencies react differently to the stress of the illness,[14] or that there may be a psychopathic predisposition.[16] The only method by which this question can be properly studied is by closer contact between the internist and the psychiatrist in the general hospital.

In making this study the writers have selected ten patients who were admitted to the New York Hospital-Westchester Division between 1916 and 1931, a period of 15 years. All these patients, six women and four men, were considered to have psychoses associated with heart disease, and were the only patients with this diagnosis admitted during that time. In comparison it may be mentioned that of 50 consecutive cases of heart disease admitted to one ward of a general hospital in a period of one year four of them (8 per cent) presented the clinical picture of "cardiac delirium." *

The background of the ten patients studied in the mental hospital is of some importance, for there were eight with a positive family history of cardio-vascular disease, and in seven of these the relationship was that of parents or siblings or both. In view of the close relationship, one is justified in saying that in addition to possible hereditary factors, these patients may have had more than the usual fear of heart disease because they had had the opportunity to observe its effects in persons close to them. The incidence of mental illness in the families of the patients was not marked, only five having a positive family history, and of these two were cases of senility which did not require hospitalization.

* Material from the medical service of the Peter Bent Brigham Hospital by permission of Dr. Henry A. Christian.

The average age of the 10 patients was 55. Due to the fact that all but one were past middle age when admitted, information concerning their early development was scanty. As far as could be determined their early development was not remarkable, and although there were the usual childhood diseases, there were no instances of delirium, nor did any of them capitalize their physical illnesses. Two were considered as having been rather frail in childhood. None presented any behavior problems in early life. The educational level of the patients was in keeping with their social and economic backgrounds. From the organic viewpoint there was no relation between occupation and the development of either heart disease or mental illness. All of the men had been successful in business and of the women, all but one had been considered very efficient, either in business or the management of their households. The four men had all married, and were said to have made good adjustments in married life. Two of the women were still single at the time of admission to the hospital, both had been unusually attached to their mothers and neither had shown much interest in men. Of four married women, three had married men who were passive and inefficient and they showed more attachment to their children than to their husbands. Two of the men had used alcohol to excess at intervals.

Of particular interest are the findings in regard to the personalities of our patients. The youngest was described as being of a placid contented nature, but all the others showed certain traits in common. All were persons who were rather ambitious, energetic, somewhat over-conscientious in work, and with a tendency to work under considerable tension. There were easily recognized feelings of inadequacy in four, and two who were not considered to have such feelings had histories of excessive alcoholism at times, which seemed to indicate a sense of inability to cope with their environments. Such expressions as "tense," "driving," "domineering," "always unusually energetic," "hard worker," "worked under pressure," and "the tense worrying type," occur with frequency in the histories of all the patients. In addition to these descriptive terms used by people who knew them, the occurrences in their lives would indicate such drives, for most of them had succeeded in spite of definite physical, social or financial handicaps.

On the other hand, in spite of their successes and superficial adjustments, close examination of their histories shows that seven of the ten actually had a great deal of emotional instability. The evidence for this ranges from such frank findings as hysterical reactions in adolescence and early adult life in one patient, to periodic drinking or expressions of inferiority in others, and finally, definite mood swings of such intensity as to call for comment from friends or relatives.

In studying the development of the mental illnesses which brought these patients to the hospital, it was found necessary to determine not only when heart disease had been first noted, but what the emotional reaction to this had been on the part of each patient. It has been stated previously that none of the patients capitalized their other illnesses, and this was found to be true for heart disease also. One, a woman of 31, had had known heart disease since an attack of chorea at 10. This had prevented her from engaging in any great physical activity, and at times had necessitated hospital care. She is said to have accepted her infirmity "gracefully," and one is inclined to wonder whether this attitude was not somewhat unnatural, especially when it was also found that she enjoyed sympathy. Another developed heart disease at about 18, but in spite of frequent periods of decompensation became a successful nurse, and never expressed worry over her condition. In a third, admitted to the hospital at 25, dyspnea had been noted after an attack of rheumatism at 23. She was not told that she had heart disease, and when given a rest treatment she thought she had tuberculosis and became greatly depressed and fearful. Among the four men, the symptoms of heart disease had begun after middle age, and all of them made attempts to ignore their incapacities, three showing a stubborn determination to continue work even when decompensated. In the three women who developed symptoms of heart failure after middle age, this same attitude was present.

There were other features of a somatic nature which had important psychological implications. Two of the patients had cataracts which were sufficiently advanced to cause a definite degree of difficulty with vision, and in one of these the psychotic reaction made its appearance when she went home from the hospital after an eye operation. Another had undergone limitation of her usual

activities because of deafness which had been developing over a period of several years. In a fourth, the cardiac decompensation began during her first pregnancy, and after delivery she was unable properly to care for her child. Two others had had severe bronchitis which had sometimes incapacitated them for work for several years before their cardiac and mental illnesses began.

Of equally great importance appeared to be those precipitating factors which might be considered as having purely emotional effects. In seven of the patients there were obvious instances of such things occurring in rather close relation to the development of the mental illnesses. One patient had been extremely unhappy since the death of a sister a year before, one had shown considerable depression after the death of her father within the year previous to admission, another had had guilt feelings about a love affair that had continued for four years and was abruptly terminated a few months before her admission, one had been worried over having to give up his home, and still another had been under much strain for a year trying to adjust to an unpleasant occupational situation. There were only three instances in which no precipitating factors of such a nature were found, and these patients were men who were ordinarily self-contained and had not unburdened themselves even to members of their families.

Since the number of our cases is too small for satisfactory statistical purposes, the average duration of cardiac decompensation before the development of the delirium cannot be accurately computed. One patient had shown signs of decompensation for only 21 days before admission to the hospital, and the serious mental symptoms had begun ten days before admission. Another had had cardiac symptoms which had disabled him for three years preceding admission, and had been mentally ill for one month when he came to the hospital. In general, our patients had been physically incapacitated for two to eight months before admission, and mental symptoms had been present to some degree for one to six weeks. In every case, the onset of mental symptoms was gradual.

There was a rather definite pattern in the development of the mental illness, but it must be emphasized that this organic reaction is not specific for heart disease and may develop in a similar way in association with other illnesses. In general, the first symptoms

were insomnia and restlessness at night, and some irritability and moodiness during the day. The symptoms gradually increased, and were followed by transient periods of confusion during which the patients might misidentify friends and relatives and show some disorientation. These periods would then increase in intensity and duration, there were increased talkativeness and restlessness, and the stream of talk would gradually begin to lack coherence. In each of the ten cases unsystematized paranoid ideas appeared, and the patients expressed such fears as that they were going to be injured, were being followed, or that members of their families were in danger. After this, auditory and visual hallucinations began to occur, agitation became extreme, talk was incoherent, rambling and occasionally limited to unintelligible muttering. Two of them made suicidal attempts. As a rule, they were not brought to the hospital until their agitation had become so marked that they could not be cared for at home even with the aid of special nurses.

In one patient the acute symptoms had developed with comparative rapidity, and she had been brought directly to the hospital. In the others, however, some form of drug sedation had invariably been attempted while the patient was at home and six of these had received narcotics, the dosages having been gradually increased as they failed to respond with sleep. One had received morphine, heroin and large amounts of triple bromides for a period of one month prior to admission. Bromides and chloral had been administered frequently for ten days to another. In none of the cases had the patients received the desired effect from these forms of sedation, but on the contrary, there had been an increase in mental symptoms following their use. Digitalis had been used in seven of the cases, five of whom had mitral valvular lesions, but only one had been digitalized. The remainder had been given small, unsystematized doses of the drug, which had had no effect in decreasing the decompensation. In general it may be said that we found a number of factors contributing to the development of the delirium rather than any single one. Among these were the physical and psychic effects of the heart disease itself, emotional strains brought about by other physical weaknesses or by difficult situations, and finally the excessive use of sedative and narcotic drugs, and unsystematized dosages of digitalis.

While the degree of mental illness on admission varied, all the patients showed the elements of the acute organic reaction. There was an extreme restlessness in every case, and many of them could be kept in bed with difficulty. This restlessness was particularly marked at night, as were all the other mental symptoms. Expressions of anxiety or apprehension were present in all of them at some time, although in two cases such feelings alternated with a mild euphoria. The stream of talk was usually rambling and incoherent, one had perseveration of speech, and three showed paraphasia. The next most common symptom was a fluctuation of the level of awareness. All of the patients were disoriented in some sphere at one time or another but it was striking to see the changes in this symptom. Patients who had been totally disoriented throughout the night, and whose attention it had been impossible to gain, would become mentally clear at intervals during the day, and not only appear to be well oriented but be able to converse coherently. Auditory and visual hallucinations were definitely present in six of the patients, absent in two, and could not be determined in two others.

While it was formerly believed that the trend of thought during delirium depended upon the type of cardiac lesion,[5] the findings in this series offer further confirmation of the more recent theory that in any organic reaction type the trend is determined by the pre-psychotic personality problems of the patient. The delirium frequently serves as a vehicle for the expression of conflicts, as shown by the belief of one patient that the wife and children of the employer to whom she was attached were waiting outside the door to kill her. These points are to be demonstrated more completely in the discussion of one of our cases.

The general physical findings in our cases may be mentioned briefly, since there was nothing unusual in any of them. Six of the patients had mitral valvular disease, of a rheumatic origin. Of these, three had auricular fibrillation and one had aortic insufficiency. Three, all men, had coronary disease, and the remaining patient's cardiac difficulty was of hypertensive origin. None of the patients had any known cerebral arteriosclerosis, and only three had peripheral involvement of the arteries. No cases were selected in which there was nephritis. Only those patients with coronary

artery disease, and the one with hypertension, showed elevations of the blood pressure. The degree of decompensation varied from orthopnea and marked generalized edema to nothing more than moderate cardiac enlargement and slight dyspnea on exertion, and there was no apparent relation between the degree of delirium and the severity of the heart disease. Four of the patients died in the hospital, and six recovered from the delirium and were discharged. The four who died were far advanced in decompensation and became semi-stuporous before death. Their deaths occurred within two to five weeks after admission.

The following case is representative of the study:

CASE 1.—This patient was a married woman of 46, who came to the hospital in a disturbed mental state and showing a marked degree of cardiac decompensation. The family history showed a tendency to the development of cardiovascular disease in the paternal line. A younger brother of the patient was mentally defective, and a younger sister developed a paranoid psychosis. The patient, who was the third of six siblings, had a normal and happy childhood, and did well in her classes. Her menses were established at the age of 13 and menstruation was regular and without complication. Nothing unusual was noted in her attitudes or behavior during adolescence. At 20 she graduated from normal school, and then taught successfully in a high school for three years. At 23 she married a brilliant and conscientious professional man who was five years her senior. There were four normal pregnancies, and all of the children were healthy. At the time of her admission their ages were 20, 18, 16 and 13 respectively. She had always been very tense and energetic and seemed to do everything under a great deal of pressure. In addition to being very efficient in the management of her household, she had many civic, social and religious interests. After her fortieth year, as her children grew older, these interests had increased. Although her attitude toward sexual matters had been that of a modest, reserved and somewhat prudish person, there was a brief period three years before admission when she had introduced her husband to a number of perverted sexual practices and following this had become frigid. Apart from the outstanding trait of tenseness, her only other personality problem had been a feeling of intellectual and social inferiority. The physical history showed that she had grown to be a very pretty and attractive girl. At 23, shortly after her marriage, she began having frequent attacks of tonsillitis. Sixteen years before admission to the hospital, when she was 30, there was an illness diagnosed as "rheumatism," characterized primarily by joint pains and three years later she had what appeared to have been chorea. After this she was in good physical health until three months before admission, at which time symptoms of heart disease appeared.

The illness which brought her to the hospital was precipitated by a number of factors in addition to the heart disease. From the psychological aspect, as

her youngest child grew older she began to show more push in her outside interests, talked of outgrowing her need in the home, and expressed a horror of growing old. Four years before admission she became attached to an erratic religious leader, idealized him and lost interest in her husband. During the last year of their acquaintance she imitated this man by taking many long, vigorous walks. About six months before admission, the pastor was forced to leave town, and three months later the patient had a sudden attack of dyspnea. Physical examination at that time revealed signs of mitral stenosis and insufficiency with auricular fibrillation. She was kept in bed for two weeks and digitalized. After this, she received a maintenance dose of 0.2 gr. digitalis daily, but it was impossible to get her to take sufficient rest. She showed a little more interest in her husband and her home until three weeks before admission. At that time, while waiting for her youngest son to have a minor operation, she suddenly collapsed, complained of weakness and said that she was "mixed up" and the "nerve of responsibility had snapped" in her head. She asked her husband to cut off her head, became noisy and tried to make vague confessions of her affair with the religious worker. She held her body in tense positions, acted as if she were being kissed, and talked of hearing the voice of the minister. Appetite and sleep were poor, and she was given such hypnotics as luminal before admission.

On admission she appeared toxic and dehydrated, and her lips and tongue were dry. The heart was enlarged, there was mitral stenosis and insufficiency with auricular fibrillation, and the pulse rate was over 100. The lungs showed signs of congestion at both bases, liver was somewhat enlarged, and the ankles were edematous. Blood pressure was 128/72. Neurological and gynecological examinations showed no pathology. Blood cytology, serology and chemistry were normal and the urine contained only traces of albumin. Mentally she was overactive, thrashed about in bed, assumed erotic postures, and smiled. She thought she heard the voice of the religious worker telling her children about sex, and had visions of airships and large white, fluffy birds. She thought she was receiving wireless messages. Her mood was changeable as shown by alternations from laughter and giggling to anger and defiance. During the day she was fairly well oriented, but at night there was confusion and misidentification of those about her. Her remote memory was good, she realized that she was mentally sick and begged for rest.

She was kept in bed for eight weeks after admission, fluids were given freely for the first week, then fluid intake was limited, and she was given a low salt, low protein diet. Digitalization was brought about in a few days by the use of 15 minims of tincture of digitalis every four hours. This dosage was then decreased to 10 minims three times a day. Elimination was aided by enemata every other day. For the first three weeks she showed a degree of fever in the evening. During the second week her overactivity decreased and she slept well at night. After the third week her hallucinations disappeared, but for the next two weeks she was suspicious and apprehensive, believed that the physician read her thoughts and that she was influenced by electrical waves. After the sixth week her suspicions disappeared, there was no evidence of decompensation, and she was allowed to sit up. At the end of

eight weeks she was able to be out of bed and the digitalis was discontinued. Her activities were gradually increased. She was able to talk about her past life, and discussed her conflicts frankly with the physician. Her husband had an understanding attitude, and interviews with them together helped in bringing about a better mutual understanding. Her improvement continued and she left the hospital four months after admission. The action of her heart was regular and there were no evidences of decompensation. She was advised to keep in touch with the physician who had treated her before admission, and who was familiar with her psychological difficulties. When last heard from six years after discharge, she was still in good mental and physical health.

Discussion and Management.

This case illustrates very well the combination of factors contributing to the mental illness. In the background one sees the usual infections associated with the development of cardiac valvular disease, in a tense, driving, energetic woman who had an underlying feeling of insecurity. Superimposed upon this were outstanding difficulties appearing in her early forties, five years before admission to the hospital. She expressed a horror of growing old, and carried on increased activities with much push and tension. Then came the affair with the religious worker, and in her emulation of him by taking long, vigorous walks, the direct effect of one of her personality drives in reducing her cardiac reserve is obvious. Her collapse while waiting to hear from her son who was undergoing an operation has a deeper psychological significance than was reached with the patient, but her behavior and talk immediately afterward when she spoke of the "nerve of responsibility" breaking, and of wishing to be decapitated by her husband, as well as the vague confessions, showed a conflict. Her behavior in the delirium was erotic, and her talk gave evidence of a sense of guilt and the need for punishment at the hands of the husband to whom she considered herself unfaithful. This harked back to a psychological situation of years' duration, a situation in which there was a definite strain upon the individual as a whole.

The management of this patient illustrates the treatment in general. In this case, rest was the first factor to be considered. This was accomplished by keeping her in bed for a long period of time. No hypnotic drugs were given, and during the day she willingly stayed in bed. At night, when there was increased restlessness and

apprehension, it was found that a special nurse was usually able to control the patient and where this was impossible, prolonged baths were given. Since she appeared dehydrated on admission, and had had sedative drugs, she was at first allowed to take fluids freely, and elimination was aided by the use of enemata. There had been insufficient digitalization, therefore she was given enough digitalis to aid her heart in regaining compensation. A diet that could be easily assimilated and would improve the state of nutrition was given. As there was improvement she was allowed to be up, and her physical activities were gradually increased in keeping with her ability. The patient stayed in the hospital long enough to discuss her emotional problems with her physician, and was thus aided in making a better adjustment after discharge. That this last point in treatment is of considerable importance in the management of any case of heart disease is borne out particularly well by the studies of Dunbar and others.[17, 18]

Summary.

1. Some of the literature on the subject of psychotic reactions associated with heart disease has been reviewed.

2. The greater incidence of such reactions in general hospitals than in psychiatric hospitals has been indicated.

3. An analysis of ten cases seen in a psychiatric hospital has been made, and it has been shown that the occurrence of delirium is conditioned to a great extent by psychological personality factors, as well as the features of decompensation, inadequate medical treatment of the heart, and excessive drug sedation. This point has been illustrated by a detailed summary of the case of one patient.

4. A general method of management of such illnesses has been suggested, with emphasis upon rest, proper elimination, absence of hypnotic drugs and proper digitalization. This should be correlated with psychotherapy to obtain the best results.

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DISCUSSION.

DR. DEXTER M. BULLARD (Rockville, Md.).—This paper really begins with the question, What does cardiac disease mean to the patient? For in anxiety states, such as deliria, this comes to the foreground.

The doctor touches on that when he emphasizes the fear that the patient has as to what cardiac illness means, and second, the dislike of being dependent on others.

Although not especially emphasized in the paper, I believe that is rather an important part of the background of why a delirium appears in cardiac disturbance, the fear and dislike of being dependent on others, for it cannot help but produce a great deal of anxiety.

A second point that I think deserves emphasis is that in eight of these ten patients they had an opportunity to be exposed to cardiac illness in some

member of the family, so that leaving out entirely any hereditary factors we do have a psychogenic trauma which cannot help play a part, particularly if the patient has been in close association with the relative in nursing and taking care of the elderly sick.

In a recent paper of Dunbar-Wolf, the fact was stressed in particular with cardiac cases, and they mention that an exposure of this kind, a social exposure to someone with cardiac illness, was just as important in the history as was exposure to tuberculosis in a member of the family.

Without question, cardiac deliria depend upon the pre-psychotic personality. All of these patients showed unsystematized delusions of persecution. Ten is not a very large number, but if you find 100 per cent of any group of people, no matter how small, it is worth thinking about, and certainly one with paranoid ideas has a great deal of underlying insecurity which, when the lid is blown off through cardiac stress, cannot help but produce a psychosis.

Inasmuch as these patients were better oriented during the day than at night, I imagine that a great deal of psychotherapy went on in the mere routine jotting down of their productions and the attempt to discuss with the patients even in the deliria, when they were not theoretically in contact, probably was quite a factor in helping these patients to recover.

From the standpoint of therapy, the usual medical measures such as anyone would employ, are resorted to. I think if the problem of anxiety is appreciated and discussed with the patients even, as I say, when they are theoretically not in contact, a good deal of the anxiety can be alleviated, and with that comes a lessening of the load on the heart and improvement of the somatic disability.

Dr. Frank Luton (Nashville, Tenn.).—There is a small group of cardiac deliria that developed after-compensations, going along nicely. The patient has not shown any evidence of a delirious state, and after digitalization, of a few days, the patient then shows a delirious reaction that I would call a cardiac delirium.

I would like to ask if the speaker would include such in that group of patients, and if he has an explanation, or if he would say what are the principal factors involved.

Dr. Clarence O. Cheney (White Plains, N. Y.).—I would like to emphasize the point Dr. Bullard made, that patients who have cardiac disease may have what has been called by Dunbar and school, a shoot-over heredity. These persons are brought up perhaps in an atmosphere of anxiety, regarding heart disease with the prospect that they may sooner or later eventually develop serious difficulty and die of it, and it is no minor or trivial situation, I assure you.

Another thing that has been emphasized is that persons who have real organic heart disease tend to minimize those symptoms and, as Dr. Drewry has pointed out, tend to keep on with their work, and that is a diagnostic differential point from the neurotic person who complains of heart symptoms

and who, rather than covering up or minimizing the heart symptoms, tends to exaggerate them.

Dr. Bullard mentioned the fact that these patients, when they were awake during the daytime, seemed more clear than at night. Those of you who recall Dr. Hoch's description of the organic delirium in 1917, will remember that the description Dr. Drewry has given of these cardiac cases corresponds almost word for word with Hoch's description of the organic and particularly cardiac delirium.

Hoch felt that the reason these cardiac persons or patients are clear in the daytime is that they have more stimulation then; whether it is psychotherapy or not, whether they are being definitely treated or not, the fact of the daylight, the fact that they can see things and people going around, tends to keep up their levels of consciousness, whereas during the nighttime it tends to dip down, as Dr. Hoch used to say, to a much lower level when they are out of contact.

Another point is to emphasize the importance of not giving sedatives and causing further difficulties with these cardiac patients. The patients that were received in the Westchester Division had a very serious complication of at least a partial drug delirium and had to be treated first for that.

Unfortunately it is a tendency of the general practitioner, to use sedatives on those cardiac cases as well as other disturbed cases, with a production of a complication of a drug delirium in which the patients may die if they are not definitely and intensively treated for that drug reaction.

It makes the treatment of the cardiac cases much more difficult and complicates the whole picture. Perhaps Dr. Drewry can answer the question that has been asked better than I can, regarding the development of apparent toxic delirium after compensation has been established. I think it may be frequent that compensation has been established by digitalization, but also, with the continuation of the administration of digitalis, the toxic state developed which is a digitalis intoxication and not a cardiac delirious reaction.

Dr. Patrick H. Drewry.—In regard to the comment regarding the small number of cases made by Dr. Bullard, I feel that this is valid and that this limited number cannot be used for statistical purposes. It emphasizes the fact that illnesses of this type can best be observed in the general hospital, and where the psychiatrist can have access to them.

We have had no cases of delirium after compensation had been restored in our series. However, I have noted such in a general hospital. I felt it was due to the excessive quantity of drugs given (as a rule, morphine is given rather heavily), and also to the fact that, as a rule, fluids are limited considerably in treating patients with decompensation. It seems to me this would allow a toxic state to arise.

I do not believe that digitalis would cause it, except perhaps in individuals who had some sensitivity to digitalis, which of course would be difficult to decide upon.

THE BEHAVIOR OF CHILDREN RECEIVING BENZEDRINE.*

By CHARLES BRADLEY, M. D., East Providence, R. I.

The use of benzedrine (beta-aminopropylbenzene; benzyl methyl carbinamine) as a central nervous system stimulant has recently aroused considerable comment. A number of reports are now available describing its effect upon the mood and other psychological reactions of adults,[1-7] but so far no one appears to have studied its effect upon the behavior of children. Since the psychological response of children to drug therapy of any sort appears to have been a generally neglected subject,[8] and since some of the changes produced by benzedrine in adults are of a type which might theoretically prove of clinical value in certain behavior problem children, the present studies were undertaken at the Emma Pendleton Bradley Home.

The facilities of this institution[9] are admirably adapted to the observation of children's behavior under controlled conditions without introducing the artificial distractions of a laboratory situation. The hospital deals only with resident patients of normal intelligence, the majority being children under 12 years of age presenting neurological and behavior disorders. Since such children require prolonged treatment the hospital setting has been designed to provide most of the desirable features of an outside community, including school, scouting activities, sports, etc. Although each child busies himself with a very natural sort of daily activity, he is under constant observation, and careful records of his behavior are kept as a matter of routine. In general, the patients are quite unaware of this close scrutiny.

To observe the effect of benzedrine upon the behavior of children, 30 patients, already resident in the hospital, suffering from a variety of behavior disorders, were selected for study. Every child in this group had already been under observation for at least

* From the Emma Pendleton Bradley Home.

Portions of this study were made possible by a grant from the Committee for Research in Dementia Præcox founded by the Supreme Council, 330, Northern Masonic Jurisdiction, U. S. A.

a month. Twenty-one boys and nine girls were studied, this ratio of sexes approximating that noted for all admissions to the hospital. The ages ranged from 5 to 14 years, two boys and one girl having passed their 13th birthday. The children's behavior disorders were severe enough to have warranted hospitalization, but varied considerably. They ranged from specific educational disabilities, with secondarily disturbed school behavior, to the retiring schizoid child on the one hand and the aggressive, egocentric epileptic child on the other. The patients' intelligence was in general quite within the so-called "normal" range.

In addition to routine observation and recording of behavior by ward nurses and teachers, each child was personally observed for a period of three weeks by a special psychiatric nurse. Because this nurse's customary duties had already involved daily close association with all of the children, she was able to observe carefully each patient without his recognition of her special function at this time. During the second week of observation a daily morning dose of benzedrine [10] was administered to each patient upon arising. Later the records of his behavior during this week were compared with those of the week prior and the week following, which were taken as control periods for this particular child.

School Performance.

Possibly the most striking change in behavior during the week of benzedrine therapy occurred in the school activities of many of these patients. Fourteen children responded in a spectacular fashion. Different teachers, reporting on these patients, who varied in age and school accomplishment, agreed that a great increase of interest in school material was noted immediately. There appeared a definite "drive" to accomplish as much as possible during the school period, and often to spend extra time completing additional work. Speed of comprehension and accuracy of performance were increased in most cases. Insight into school improvement was generally present, though few of the children attributed it to the medication they had received earlier in the day. The improvement was noted in all school subjects. It appeared promptly the first day benzedrine was given and disappeared on the first day it was discontinued.

There were 15 children who did not show so striking a change, and one child who was not of school age. Of the 15, eight did show some improvement, accompanying other temporary changes in their personal characteristics. Five others showed no change in school performance, although their behavior in other respects was distinctly altered. Two children showed no response to the drug in school or elsewhere.

Emotional Response.

In discussing emotional responses it must be kept in mind that in many of these children the conduct disorder was essentially an external symptom of emotional maladjustment. Fifteen of the 30 children responded to benzedrine by becoming distinctly subdued in their emotional responses. Clinically in all cases this was an improvement from the social viewpoint. In many it was accompanied by a sense of well-being; but superficially the appearance was that of a child whose mood swings had become diminished. In this group were some children who had expressed their irritability in group activities by noisy, aggressive, domineering behavior. Such children under the influence of the drug became more placid and easy-going. Coincidentally, they seemed to become more interested in their surroundings. Such changes, however, by no means paralleled the improved school performance noted above as only seven children were common to both groups.

A variety of emotional responses were noted in the remaining 15 children. Seven of them gave evidence only of a sense of well-being, even to the point of mild euphoria. Although questioning the children in regard to their subjective feelings was studiously avoided in all instances, spontaneous remarks such as, "I have joy in my stomach," "I feel fine and can't seem to do things fast enough today," "I feel peppy," "I start to make my bed and before I know it, it is done," and "I feel fine," seemed significant. All of these patients showed a widening of interest in things around them, and superficially at least, a diminished tendency to be preoccupied with themselves.

Three other patients were observed to cry much more easily during the week that they received benzedrine, as though their emotions were more easily aroused. Two others were noted to wear

worried expressions quite foreign to their usual appearance. Only one child of the entire 30 responded to the medication by becoming more hyperactive, aggressive and irritable.

As was the case with alterations in school performance, all these changes appeared promptly on the first day of treatment and disappeared as soon as the drug was stopped.

Other Psychological Changes.

A drug whose action is that of a stimulant may naturally be expected to produce changes in motor activity. In children, however, it is extremely difficult to measure motor activity *per se* apart from the individual's general behavior as shown by his mood and his intellectual activity. In our patients some decrease of motor activity was usually noted in the children who became emotionally subdued. A few of those who responded with elation possibly became a little more active, particularly in their daily routine about the hospital. Only three patients showed an increase in motor activity not explained by other changes. These three boys became active to the point of agitation, ran about rather than walked, talked more rapidly, and in general were so stimulated as to interfere with the efficiency of their daily work in school and on the ward. One of these was the child who became noisy and defiant.

Another boy, previously mentioned as having a worried expression, and also included among the three whose motor activity increased, expressed feeling of agitation and worry, was afraid to go out for fear he might run away, and was at times fearful of death. He had not manifested such symptoms before.

It will be noted that comparatively little mention has been made of the patients' subjective feelings under the influence of benzedrine. Personal questioning of any child was deliberately avoided so as not to influence his behavior artificially through suggestion or by indicating that he was the object of particular attention. Records of subjective responses are therefore limited to the occasional spontaneous remarks which the children made, and which have already been mentioned.

Physiological Observations.

In view of the observations of others that certain physiological changes [1, 6, 11, 12] may follow benzedrine therapy, such routine ex-

aminations as would not artificially influence behavior were carried out during these studies. On the doses of benzedrine which were given blood pressure was noted to rise moderately but inconstantly during each day on about half the children. There was no significant change in the erythrocyte count or hemoglobin level as a result of the week's treatment. Body weight was not appreciably influenced. In six of the 30 children nocturnal sleep was mildly disturbed, as evidenced by a delay in the time of falling asleep for the first night or two. One patient remained awake to a late hour for four nights. Loss of appetite and nausea at the time of the morning meal were observed in a few of the children at the start of the experiment. Intolerance of the conventional dose when present was uniformly expressed by malaise, nausea and epigastric distress, persisting for an hour or two, and usually relieved by rest. Agitation and irritability, said to be characteristic of overdosage in adults, were observed in but one child.

Duration of Effect.

Psychological effects were noted to appear in the majority of the children 30 to 45 minutes after oral ingestion of the drug. Behavior changes were at their height during the second and third hours, with gradual disappearance over a period of 6 to 12 hours. Occasional sleep disturbances 16 or more hours after the morning dose suggested that in a few individuals the stimulating effect was more persistent. In all instances the full effects appeared on the first day of administration, continued daily throughout the week and disappeared permanently as soon as the drug was discontinued.

Dosage.

The 30 children who were the objects of this study received single morning doses of benzedrine sulfate upon arising. It was found, on the basis of giving gradually increasing trial doses to a few of the children, that 20 mg. was generally a satisfactory amount to produce changes in behavior without undesirable physiological consequences. All the children studied were then given a trial dose of 20 mg., but in eight instances this resulted in gastrointestinal distress sufficient to color all the child's reactions. These eight children were therefore given 10 mg. as their daily dose during the

week. Two of them showed no response of any sort on this amount, suggesting that the largest dose they could tolerate was therapeutically ineffectual. The remaining patients all received daily doses of 20 mg., except one boy who tolerated 30 mg. very well and received that amount. There was no apparent relationship between the children's ages or weights and their reaction to benzedrine.

Comment.

Possibly the most spectacular change in behavior brought about by the use of benzedrine was the remarkably improved school performance of approximately half the children. This is the more striking when we note that these patients were of good intelligence and that they were receiving adequate attention for any personality disorders which might affect their school progress. Moreover they were already in a school where specially trained, sympathetic teachers dealt with their pupils either on an individual basis or in very small groups. To see a single daily dose of benzedrine produce a greater improvement in school performance than the combined efforts of a capable staff working in a most favorable setting, would have been all but demoralizing to the teachers, had not the improvement been so gratifying from a practical viewpoint.

No entirely plausible reason for this acceleration of school performance is evident aside from the fact that a stimulating drug was used. However, at least half of the whole group of children did not show this striking response in school, in spite of the fact that most of them responded in other ways to the medication. Only half of the group showing favorable mood changes shared to a notable degree in the school improvement.

As far as improvement in individual school subjects was concerned the teachers were most impressed by changes in arithmetic performance, since speed of comprehension, degree of accuracy and quantity of output were all favorably affected.

It appears paradoxical that a drug known to be a stimulant should produce subdued behavior in half of the children. It should be borne in mind, however, that portions of the higher levels of the central nervous system have inhibition as their function, and that stimulation of these portions might indeed produce the clinical picture of reduced activity through increased voluntary control. Pre-

sumptive evidence that this may be the case is suggested by electroencephalographic studies,[13] which formed part of the clinical examination in 20 of our 30 patients. Definite abnormalities of the brain rhythms were noted in 11 of these children, eight of whose records showed the " spike and slow wave " form characteristic of the " seizure waves " seen in patients with petit mal epilepsy [14] and in some children whose erratic, irritable and aggressive behavior resembles that of epileptic patients.[15, 16] It may be significant that all but one of these children with " seizure waves " became distinctly subdued under the influence of benzedrine. Since it has also been noted that " slow waves " in the electroencephalogram are likewise present in a number of conditions where consciousness is impaired, it has been suggested that their appearance indicates impaired cortical functions.[17] One might postulate that a stimulating drug like benzedrine may tend to arouse this impaired cortical activity and alleviate any behavior disorder resulting therefrom. Further studies are necessary to confirm this.

There are, of course, a great many other possible factors entering into the genesis and clinical manifestation of any child's behavior problem. Complete understanding of the fact that children vary in their response to benzedrine awaits correlation of this variability with these many factors. From preliminary observations of the 30 children in this series there seems to be very little apparent relationship between a child's response to benzedrine and the conventional clinical characteristics of age, sex, past history, physical condition, reaction type, intelligence and special mental abilities or disabilities.

In spite of the attractive results obtained in this small group of patients, and the apparent low toxicity of the drug as evidenced by its prolonged use in the hands of other observers,[6, 7] it seems wise to await more complete knowledge of the action of benzedrine before recommending its clinical use in behavior problem children. Presumably the uncomfortable, though not necessarily dangerous, gastrointestinal symptoms which accompany overdosage indicate that the drug should be administered only by the experienced physician. The factors involved in children's behavior disorders are so many and varied that they can be competently evaluated only by physicians adequately trained in child psychiatry.

Any indiscriminate use of benzedrine to produce symptomatic relief might well mask reactions of etiological significance which should in every case receive adequate attention.

Summary.

The psychological reactions of 30 behavior problem children who received benzedrine sulfate for one week were observed. There was a spectacular improvement in school performance in half of the children. A large proportion of the patients became emotionally subdued without, however, losing interest in their surroundings. A variety of other definite behavior changes were also noted. Dosage, unfavorable responses, and duration of effect of the drug are discussed, and it is suggested that its use in the treatment of children with behavior disorders be supervised by physicians trained in child psychiatry.

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THE EFFECT OF BENZEDRINE SULFATE ON THE INTELLIGENCE SCORES OF CHILDREN.*

By MATTHEW MOLITCH, M. D., Philadelphia, Pa.,
AND
AUGUST K. ECCLES, M. S., Jamesburg, N. J.

Benzedrine sulfate (benzyl methyl carbinamine) has been noted by Peoples and Guttman,[1] Myerson,[2] Nathanson,[3] and others to have a stimulating effect psychologically. A feeling of exhilaration and a sense of increased energy and capacity for work were noted in adults. Sargant and Blackburn [4] investigated the effects of benzedrine on 48 adult patients in a mental hospital, using Cattell's intelligence tests, and noted an 8 per cent improvement in the test scores. They hoped that their results would stimulate other clinics with adequate facilities to study a more homogeneous group with varying doses.

Ninety-three boys, between the ages of 11 and 17 and of varying mental levels, were examined with a battery of tests before and after medication. Table 1 gives the distribution of our cases according to age, color and mental level. Approximately one-half of our boys were given a placebo instead of benzedrine in order to ascertain the degree of suggestion. The placebo in every way resembled the benzedrine tablet physically as both were stamped out in the same tablet machine. Our cases are all inmates of the New Jersey State Home for Boys, and were committed by court because of juvenile delinquency. They did not have the serious mental deviations which were present in Sargant and Blackburn's [4] cases.

We were unable to express our results in a percentage deviation from the control intelligence quotients (I. Q.), as did Sargant and Blackburn,[4] because of the variety of tests we employed. On the other hand, we were able to study the effects of benzedrine on the motor, psychomotor and verbal responses of our subjects. All of the subjects of the experiment underwent the following tests: strength of grip, motor coordination, memory for designs, and one

* From the New Jersey State Home for Boys and the Department of Neurology, School of Medicine, University of Pennsylvania.

We wish to thank Mr. R. W. Webb of the Smith, Kline and French Laboratories for supplying the benzedrine sulfate.

of three highly standardized verbal intelligence tests. These three general intelligence tests were used to fit the wide variety of mental levels known to be present in the group.

A brief description of the tests used is given below. The strength of grip was tested by the Smedley dynamometer. A single trial with each test was allowed. The score recorded was the average "pull" of both hands expressed in kilograms.[5] In the Witmer form board test, each subject was allowed three trials according to the procedure described by Young.[6] Two scorings were recorded

TABLE 1

AGE, COLOR AND MENTAL LEVELS OF SUBJECTS.

Age.	Total No.	Color.		No. taking placebo.	No. taking benzedrine.	Mental levels.*		
		White.	Black.			Average normal.	Inferior normal.	Subnormal.
11.....	10	6	4	3	7	3	3	4
12.....	17	11	6	9	8	5	7	5
13.....	19	11	8	8	11	7	5	7
14.....	12	7	5	6	6	4	4	4
15.....	25	15	10	13	12	8	11	6
16.....	9	6	3	5	4	3	3	3
17.....	1	1	0	1	..	..	..	1
Totals.....	93	57	36	45	48	30	33	30

* The average normals had an I. Q. of 90 or above; the inferior normals between 75 and 90; and the subnormals below 75. For the white boys the I. Q. ranged from 58 to 107; interquartile range, 67-90; median, 80. For the colored boys the range was between 60 and 111; interquartile range 69-88; median 80.

for this test; the shortest time taken for any of the three trials and the total time taken for all three trials, the scores being expressed in seconds. In the memory for designs,[7] four cards bearing unusual designs were exposed for 10 seconds each. After each exposure, the subjects were given time to reproduce with paper and pencil what they saw and the scores were expressed in points. In the Kent E. G. Y. test[8] of general intelligence, an oral questionnaire was used as it is especially suited for illiterate subjects. The scores were expressed in mental ages. In the Morgan intelligence test,[9] the subjects were given alternate A and B forms. In these tests, the subjects write their answers, and the scores ob-

tained were expressed in mental ages. This test is quite adaptable to children of inferior general verbal ability as well as to the more capable. The Kuhlman-Anderson intelligence test [10] is similar and discriminative. The scores with this test were also expressed in mental ages.

Every boy received the three motor and psychomotor tests and, in addition, one of the above-mentioned verbal intelligence tests. The subjects were tested in fairly homogeneous groups of five or six at a time. We received excellent cooperation as our boys are accustomed to receiving tests. Control tests were given each subject, and about 40 days later he was retested, one and one-half hours, after either a placebo or benzedrine tablet was ingested (10 mg.). The psychologist giving the tests did not know which of the boys received the placebo or benzedrine. Records were kept of unfavorable reactions, and it is interesting to note that more were observed among the boys receiving the placebo than among those taking the benzedrine. Dizziness was noted twice in the boys receiving benzedrine while not at all in the placebo group. Nervousness was observed more often in the placebo group. The boys were retested again about 40 days later after two tablets (20 mg.) of placebo or benzedrine were ingested. Thirty-eight boys were again retested after being given three tablets (30 mg.) of placebo or benzedrine. In this last group, the Morgan intelligence test was not given.

Table 2 gives the results of our study. These results are expressed in percentage change from the median of the scores of the control tests. With few exceptions, there was found to be an improvement in the scores after both the placebo and the benzedrine were ingested. In previous experiments with placebos, we have always found an improvement due to its psychological effect. This effect was not noted in Sargant and Blackburn's group.[4] The children taking the benzedrine showed a greater improvement over those taking the placebo, but not to the same extent as that found by the aforementioned authors.

Summary and Conclusions.

Ninety-three boys between the ages of 11 and 17, and of varying mental levels, were tested at intervals before and after a placebo or benzedrine sulfate were ingested. Both groups improved their

scores, the children tested after taking benzedrine exhibiting a greater improvement than those taking a placebo.

TABLE 2

EFFECT OF PLACEBO AND BENZEDRINE SULFATE ON INDIVIDUAL TESTS AS EXPRESSED IN PERCENTAGE CHANGE FROM THE MEDIAN OF THE SCORES OF THE CONTROL TESTS.

	Placebo.			Benzedrine.		
Test.	10 mg.	20 mg.	30 mg.	10 mg.	20 mg.	30 mg.
Strength of grip.....	0	+ 4	+ 6	+ 8	+10	+11
Witmer form board best score	+7	+11	+11	0	+ 9	+21
Witmer form board total score	+6	+11	+12	+10	+12	+18
Kent E. G. Y.	0	0	+12	+ 5	+ 3	+11
Morgan's intelligence test.	+1	+ 5	..	+ 6	+18	..
Kuhlman-Anderson intelligence test	+5	+ 9	+13	+ 8	+12	+12
Army designs	0	+16	+23	+10	+20	+19
Total percentage change..	19	56	77	47	84	92
Average percentage change	2.71	8.0	12.83	6.71	12.0	15.33

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A PSYCHIATRIC STUDY OF RECIDIVISTS.*

By CHARLES B. THOMPSON, M. D., New York City.

Civilized societies have long pointed to the seriousness of the problem formed by the recidivists or repeater criminals. One of the earlier works on the subject bears this striking title: "Britain's Blot, Recidivism: Habitual Criminality, and Habitual Petty Delinquency; A Problem in Sociology, Psycho-Pathology, and Criminology."[1] Different authorities[2] have said that some 48 per cent to 70.8 per cent of the prisoners in any given court are repeaters; in the Court of General Sessions they comprise about 50 per cent to 60 per cent. They have been described as "habitual," "persistent," "chronic" offenders; the general feeling among those who have most to do with them has been that they are *wilfully* antisocial.

The causes of repetition have been considered by criminologists to be as follows; unfavorable home or neighborhood environment; poor school adjustment; association with older criminals either on the street or in prison; lack of economic opportunities; or some form of psychopathology in the individual. All of these theories, however, while accounting in part for crime, do not go deep enough, and it is generally conceded that they are open to very serious questioning. When the unfavorable conditions are reversed, many individuals do not alter their behavior. Also we find that some children from good schools and apparently favorable economic circumstances take up antisocial lives, while from the slums have

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[2] Sutherland, Edwin H., "Principles of Criminology," Philadelphia, J. B. Lippincott Co., 1934, p. 546.

Healy, Wm. "The Individual Delinquent," Boston, Little Brown and Co., 1929; p. 10.

come many of our most reputable citizens. When the antisocial individual is offered an opportunity at a regular task, he is apt soon to sicken of its monotony and turn against it. This is common knowledge among students of crime, and the authorities are unanimous in their observation that the commonly ascribed causes of crime do not account for the permanence of the antisocial reaction in the individual and that there is need for still further study.[3]

Our studies in the Psychiatric Clinic of the Court of General Sessions in New York City indicate that a repetition of crime proceeds from a certain automatic behavior pattern or set-up in the individual organism which will react whenever the appropriate and familiar stimuli are encountered. This pattern is apparently not altered by imprisonment or punishment, no matter how often imposed or how long, nor do our present methods of re-education influence it.[4] The individual seems unable to take up new ways of livelihood.

In an earlier article,[5] I mentioned that beneath all crime there exists what is commonly known as aggressiveness or competition. I indicated that this reaction of competition obtains also in the lives of all of us—in business, sports, diversions and family con-

[3] The National Commission on Law Observance and Enforcement (Wickersham Commission) submitted its exhaustive report for 1931 with this striking initial statement: "We find it impossible comprehensively to discuss the causes of crime or factors in non-observance of law. Criminology is remaking, the social sciences are in transition, and the foundations of behavior are in dispute."

Sheldon Glueck in "One Thousand Juvenile Delinquents" (1934) states: "May it not well be that the fiber of criminality is much tougher than we have thus far believed and that its tangled roots lie deeper than we have over-optimistically assumed? . . . . Great humility on the part of all concerned with this colossal problem is called for. . . . . We cannot have too much thorough-going research into fundamentals."

William Healy and Augusta F. Bronner in "New Light On Delinquency and Its Treatment" (1936) state: "Altogether it can be seen that our research into fundamental causes has left us with the conviction that the checking of a delinquent career once started is no easy matter."

[4] See Glueck, Sheldon and Eleanor T., "500 Criminal Careers," Alfred A. Knopf, New York, 1930.

[5] Thompson, Charles B., "Some New Aspects of the Psychiatric Approach to Crime"; Mental Hygiene, Vol. XX, No. 4, October 1936.

tacts—and has an equally pathological obsessive quality. I endeavored, therefore, to bring out that a comprehensive study of crime includes all those factors in man's make-up which enter into his feeling and thought-processes to cause the reaction designated as competition.

In pursuance of this trend, a study of all the repeaters in the Court of General Sessions for the year 1935, namely, 1380, indicates certain interesting facts. The psychotic repeaters numbered only .6 per cent. This shows very little increase over the proportion of total insane in hospitals for mental disease to the total population

TABLE I.

MENTAL DEFECTIVE REPEATERS GROUPED ACCORDING TO AGES AND NUMBER OF OFFENSES.

No. of offenses	2	3	4	5	6	Total
Age Groups						
16-20	7	3	0	1	1	12
21-25	5	0	0	1	0	6
26-30	2	6	1	2	2	13
31-35	1	0	1	0	0	2
36-40	1	0	0	0	0	1
41-45	0	1	0	0	0	1
46-50	0	1	0	0	0	1
Total	16	11	2	4	3	36

for 1935, namely, .3 per cent.[6] The defectives among the repeaters numbered only 36 which is 2.6 per cent of the total. The correlation of age and recidivism among the defective repeaters is shown in Table I. Individuals with psychopathic personality among the repeaters numbered 5.6 per cent. Table II shows the recidivism of the repeaters with psychopathic personalities. These figures for the repeaters are essentially the same as for the whole clinic population for four years,[7] and total only 8.8 per cent. Therefore, we must look to the remaining 91.2 per cent for the essential question of recidivism. Table III shows the distribution of the repeaters by age-groups as compared with first offenders.

[6] U. S. Dept. of Commerce, Bureau of the Census, "Patients in Hospitals for Mental Disease, 1934," p. 8.

[7] Bromberg, Walter, and Thompson, Charles B., "The Relation of Psychosis, Mental Defect and Personality Types To Crime"; Journal of Criminal Law and Criminology, Vol. XXVIII no. 1, May-June 1937.

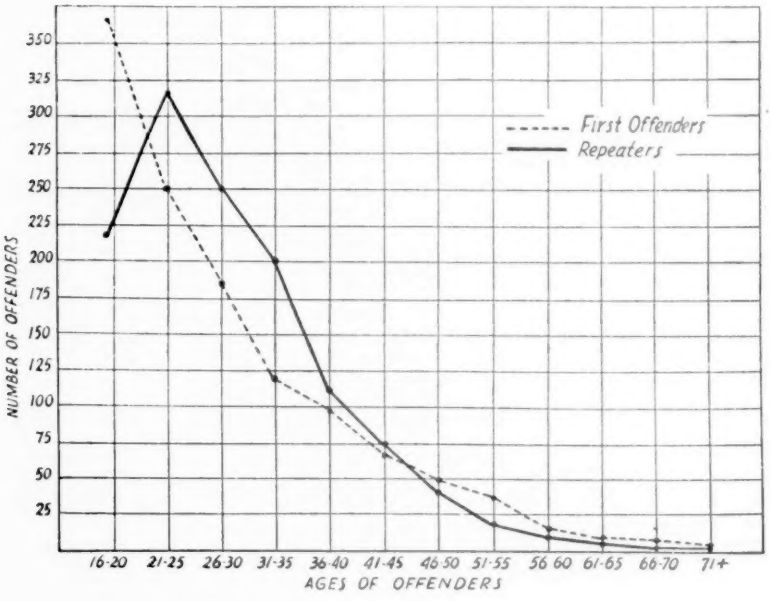
TABLE II.

REPEATERS WITH PSYCHOPATHIC PERSONALITY, GROUPED ACCORDING TO AGES AND NUMBER OF CONVICTIONS.

No. of convictions	2	3	4	5	6	7 or more	Total
Age Groups							
16-20.....	9	2	1	0	0	0	12
21-25.....	7	5	3	6	1	2	24
26-30.....	5	0	2	2	1	0	10
31-35.....	0	6	3	2	1	0	12
36-40.....	0	1	2	0	1	3	7
41-45.....	1	1	0	1	0	4	7
46-50.....	0	0	0	0	1	0	1
51-55.....	0	1	0	0	0	1	2
56-60.....	0	1	0	0	0	0	1
61-65.....	0	0	1	0	0	0	1
Total.....	22	17	12	11	5	10	77

TABLE III.

COMPARISON OF ALL REPEATERS WITH FIRST OFFENDERS, ACCORDING TO AGE-GROUPS.



In Table IV we have listed all of the repeaters, exclusive of the psychotic, mentally defective and those with psychopathic personalities, who were examined in the Clinic in the year 1935, as compared with the first offenders of that year. We have made our estimate on the basis of convictions only, so that no individual is called a repeater merely because he has been in Court on previous

TABLE IV.

REPEATERS ACCORDING TO AGE-GROUPS AND NUMBER OF OFFENSES.

No. of offenses / Age groups	2	3	4	5	6 or more	Total recidivists	First offenders	Total age group
16-20.....	110	64	25	7	13	219	364	583
21-25.....	133	80	55	31	18	317	253	570
26-30.....	86	59	52	31	26	254	190	444
31-35.....	68	48	30	25	31	202	121	323
36-40.....	32	26	18	13	25	114	98	212
41-45.....	30	9	14	8	15	76	67	143
46-50.....	14	6	8	3	10	41	48	89
51-55.....	7	3	3	2	4	19	37	56
56-60.....	3	1	2	1	2	9	16	25
61 plus	2	1	3	1	1	8	16	24
Total...	485	297	210	122	145	1259	1210	2469

NOTE.—The coefficient of contingency showing the correlation between the number of arrests and age is .25. This shows a very slight correlation in excess of what would be expected on a basis of pure chance. It indicates that the number of arrests increases slightly with increase of age but this probably indicates nothing more than that it requires time to acquire a record of several sentences.

Another table not given here in which the age-groups and number of offenses have been "telescoped" shows this more definitely. The age groups have been merged so that we have one group containing those below 40 and another of those above. The individuals grouped according to the number of offenses have been merged into first offenders and repeaters (two or more). This table shows a trend toward a greater concentration of recidivism in the lower age groups. This indicates still less correlation between age and number of offenses.

While the number of convictions is no accurate index of recidivism, since more serious crimes usually incur longer sentences and hence are less apt to be repeated, nevertheless it serves as a rough index of recidivism. The first offenders are also listed for comparison.

occasions. This makes the first offenders some 15 per cent higher than they would be as calculated on the other basis.

It is first to be noted that the total number of defectives is only 36, namely 2.6 per cent of the total. Furthermore, the defectives practically disappear from the ranks of recidivists above the age of 30. By far the largest proportion of the defectives are among the second and third offenders.

The most striking fact in Table II is the large number of recidivists with seven or more offenses. They are nearly half the number of those with only two offenses. The psychopaths show a high degree of recidivism. Their total number, however, is proportionately small, only 5.6 per cent of all the recidivists.

In Table III the curve of age distribution of the recidivists follows very closely that of the first offenders. At the age of 45 and beyond, the number of the chronic offenders drops below that of the first offenders. We are not prepared to give at the present time the explanation for this marked falling off of chronic offenders, but it is possibly due to the fact that many of them are incarcerated and others may have succumbed to disease or accident.

Most important of all, Table IV shows that when we calculate the correlation between age and the number of convictions among the recidivists, age has very little to do with the matter. Expressed in another way, we find that recidivism is about as much a function of youth as of age. As a matter of fact, the antisocial individual very often shows his unwillingness or inability to adapt himself socially at a very early age.[8] *We may find the repeater reaction fully established at 18 as well as at 38.* Usually the antisocial adaptation is set up so early that the individual does not care to learn a trade and hence has no means of earning any but the most meagre living and this at hard labor. Different individuals show the repeater reaction in varying forms; for instance, one may be a repeater at picking pockets, another at burglarizing flats, a third as a large scale swindler,[9] or a fourth as a hijacker or hold-up man. Though the external forms or mechanisms of the antisocial reaction may vary widely, the central situation is, however, essentially the same.

A characteristic case history from my records is as follows:

The defendant is about 23 or 24 years of age. His father was a chronic alcoholic. As a boy he was a truant and was in trouble for two or three years

[8] This agrees with findings of Healey (The Individual Delinquent, p. 10), Glueck (*op. cit.*), Burt (The Young Delinquent, p. 19), Halpern (Studies of Recidivism in Yearly Reports of Probation Department of Court of General Sessions for 1933, 1934 and 1935), and others.

[9] Drs. Walter Bromberg and Sylvan Keiser present an extensive discussion of the mechanism of the swindlers in their paper: "A Psychologic Study of the Swindler."

in school on this account, and was finally sent to a truant school. Some time after leaving, he committed several minor larcenies and was sent to a reformatory. He later committed a serious burglary and received a sentence of several years. At the present time, he re-appears in the court after being released only some 6 or 8 months. He states that, on leaving prison, he got some work with considerable difficulty, but, "like everything else, I soon got tired of the job and quit." He has not been able to get one since. One evening, he felt "disgusted," probably somewhat depressed, and as he was going by an apartment house, went up through the stairway and down a fire-escape and burglarized a couple of apartments. He casually rode away on a trolley car and was intercepted by the police a few blocks further on.

Another man is aged 38. Likewise a product of a "broken home," his activities have been that of a hotel thief and he had made a very good living in this way. He has been arrested on many occasions and has had three felony convictions, and, being now on parole from State Prison, he has every inducement to avoid taking risks. But finding no other opportunity for employment, he became affiliated with a detective who made a practice of retrieving stolen jewelry by acting as a go-between between the insurance company who offered the reward and the thieves who abstracted the jewelry. The defendant was the contact man. He went to Palm Beach as part of his work and there got into difficulties with his former wife whom he had divorced. She caused his arrest and he was put out of town and so returned to New York. Here he had no occupation. He was walking through a hotel, happened to see a room door open; inevitably he stole something and is now finishing out his life in prison under the Baumes Law.

Here we have a type of behavior that is frequently met with. From a disorganized home the individual early indicates his dislike of routine work and becomes an "offender." Though a repeater, he tries to conform. But no matter how he rationalizes his behavior, he repeats his antisocial activities automatically and without any apparent predetermined plan.

Consider also this boy who is only seventeen. He comes from a good family in Massachusetts, his father being principal of a large high-school of the town in which the family lived. The boy showed many temper-tantrums in public school and was often in difficulties for striking his teachers. He has committed a series of larcenies of weapons in his native town without, however, being caught. Three years ago, he was arrested for "breaking and entering and larceny in the night time," and was sent to the Lyman School for Boys. Soon after leaving there, he was again arrested for "breaking and entering" and was again sent to the Lyman School. He escaped and was returned repeatedly. After his last escape, he came eventually to New York City. He was arrested here as he came out of a burlesque theatre because the butt of a revolver was seen protruding from his inside coat pocket. A quantity of jewelry was found in his possession that had been stolen in

another city. He gives the familiar misstatement that he "found the jewelry in a box-car" at the time when riding the "side-door Pullmans." He also claims to live in "jungles." The boy has the attitude and expression of the old-timer in spite of his youth and the presumable advantages of a good home environment.

Let us take another boy of favorable home conditions. This youth, now 21, has been becoming involved with the law off and on for the past five years. The son of well-to-do parents living in an excellent suburb of New York, he first got into difficulties by stealing a wallet from the locker room of the country club, at about the age of 15 or 16. Since then he has been sent to a fashionable military school and here he was requested to leave because he persisted in writing checks when he had no bank account. These were made good by an indulgent aunt. He returned to New York City but lived with this aunt who continued to over-indulge him. The boy is very wilful, spoiled. He is impulsive in spending money and very often when without funds writes a bad check which the aunt redeems. On a travelling trip in the South, he became involved with the law by walking out of a hotel without paying his bill and was recently arrested because he paid his hotel bill here in New York with a forged check. He was placed in the country on probation but did not like the circumstances and insisted on following his own way and coming to New York. He was returned to the simpler environment but it was not long before he got into difficulties through misuse of his employer's funds and he was finally sent to the reformatory. This youngster cannot put the consideration of his own temporary inconvenience above the threat of a prison sentence.

We see here again, in varied setting, the unmistakable repeater behavior, irrespective of age and environment. We see coincidently the automatic revolt against good behavior and the equally automatic return to so-called "bad" behavior. Also it is sufficient for the antisocial individual that *he wants* something—money, or watch or automobile—and he then forthwith appropriates it according to his wishes. He also evidences a persistence in his reaction type. There is, in general, a tendency for the individual to hold to one type of offense, though the more restless and more reckless individuals may progress into more and more aggressive crimes.

Many antisocial individuals have expressed to us, in one way or another, that they would rather run the risk and seek large amounts of money by illegal means than work regularly and laboriously for only moderate amounts. As they put it: "Why should I work all day for $20 a week, when I can go out and steal it in half an hour?" The hotel thief whose case has just been cited said, "You are used to getting money easy and lose the taste

for work. You get desperate when you are broke and do a crime." They express this in another way by saying, "Once you get hold of easy money you never want to take a regular job. It kills all interest in it." They dislike work, consider it a hardship and look upon it with pain.

These four individuals may be considered, then, as a fair sample of the cases of repeater-criminal that pass through our clinic. They are representative in general of the antisocial individual whose behavior may be characterized, as I have indicated, as being aggressive, competitive and indifferent to the welfare of others about them. Also, in accord with the findings of our clinic, this antisocial individual is exceedingly egocentric. And I should like in particular to call attention to the reaction, common among them, of placing a marked over-emphasis upon their own importance as individuals.

In this problem of the repeater criminal, that has so long puzzled the best of our students, lies a direct challenge to our civilization. As I have remarked elsewhere, the reactions common to the criminal are reactions that are common to mankind generally. In the behavior of the recidivist this observation is equally pertinent. We are confronted not so much by a problem that is isolated in the behavior of a special class of individuals as by a condition that exists throughout the race of man. Accordingly in our need for a broader approach to our problem we must establish a basis of observation that will encompass the generic factors that lead to antisocial behavior in mankind.

In this situation I cannot do better than refer to reports of Burrow's investigations of human behavior in which he states that we are confronted with precisely this problem in the attempt to cope with the underlying factors responsible for mental and nervous disorders. In his studies he found it essential to adopt a broad phyletic approach which considers each individual as an essential element in, an intrinsic member of, his race. For some years Burrow [10] has emphasized the fact—to take but one aspect of his thesis—that our social structure puts each individual through a very definite process of conditioning, a conditioning that is in direct opposition to in-

[10] Burrow, Trigant, "Social Basis of Consciousness," 1927, London, Kegan Paul, Trench Trubner & Co. Ltd.; New York, Harcourt Brace and Co., Inc. Pp. 50-55.

trinsic patterns of expression and of development. Broadly speaking the individual is conditioned almost from birth to believe that all actions, and even all thoughts are to be divided into the two categories, "good" and "bad." The child is constantly admonished to be "good," or to "do the right thing"; to avoid being "bad" or doing the "wrong" thing.[11] He is conditioned not merely by words but actually by tone, manner or general behavior to feel that "good" behavior will be approved and rewarded, and that "bad" behavior, namely that behavior which causes inconvenience to the parent or the admonisher, will result in disfavor and discomfiture.

At the same very early period of his life, each of us as an individual is conditioned to react with a special affective content to the stimulus word "you" or, as he himself feels it, "I," and the picture or image denoted by this word comes to have more importance than everything and everyone else in the world.[12] After constant re-emphasis by our social environment, this image of one's self becomes an artificial center about which all else rotates. "*You* did this," each of us is told as children, and "look out for *your* toy, or brother will get it." "Johnny Smith is a *good* boy, he behaves *better* than *you* do." "Work hard in school and be first in the class; *you* will get the prize."

We are thus conditioned to associate this idea of "good" and "bad," or "right" and "wrong," with the image "I" which each is given of himself. That which is "good" is to the advantage of this "I" and is to be sought, and that which is bad is to the disadvantage of the "I" and is to be avoided. Experiments in a group or social setting made in the laboratory of The Lifwynn Foundation[13] evidence the fact that every individual, normal or

[11] Burrow, Trigant, "Crime and The Social Reaction of Right and Wrong." Jour. of Criminal Law and Criminology, Vol. XXIV, No. 4, Nov.-Dec. 1933.

[12] Burrow, Trigant, "The Autonomy of the "I" From the Standpoint of Group Analysis," Psyche, Vol. VIII, No. 3, January, 1928.

[13] Burrow, Trigant, "The Basis of Group-Analysis, or the Analysis of the Reactions of Normal and Neurotic Individuals"—The British Jour. of Medical Psychology, Vol. VIII, Part 3, 1928.

Syz, Hans C., "Socio-Individual Principles in Psychopathology," The British Jour. of Medical Psychology, Vol. X, Part IV, 1930.

Galt, William, "Phyloanalysis, A Study in the Group or Phyletic Method of Behaviour-Analysis," Psyche Miniature Series, London, Kegan Paul, Trench, Trubner & Co., Ltd. 1933.

neurotic, great or small, is preoccupied with thoughts of himself and his advantage. It is obsessive with us. Each one becomes so conditioned that his thought automatically is "how will what is going on in this moment cause *me* gain or loss?" Normal individuals then are conditioned to a self-preoccupation—egocentricity—and to self-acquisitiveness.

This conditioning process early results in the isolation of each individual. This "I" is not the total organic personality, nor is the coincident "good" the basic need of organismic man. Accordingly, the criterion for what is good or bad is continually shifting. What is good in the eyes of one person may be bad in the eyes of another and *vice versa*. So that what we are trained to do is to present continually an *appearance* of doing what is held to be "good" or approved as conceived by the person or persons before us at the moment, or to give an appearance of feeling that fits in with the circumscribed opinion presented by the community, with its traditional thought patterns and prejudices.

By virtue of the image of himself which is thus secondarily acquired by the individual, and which differentiates him competitively from all others of his kind, an overemphasis is put upon the individual and in turn he is given an exaggerated sense of his own importance. He feels, though he naturally has no clear perspective on it, that his health or his ills, his likes and his dislikes, his gains or his losses are many times more important than those of his neighbor. Concomitant with this emphasis upon the supreme importance of each "I," each individual keeps secret this preoccupation with self-advantage and acquisition, and thus, in his feeling, others come to constitute competitors against him.

Any encroachment upon the assumed domain of this "I" by some other "I"—whether the domain be the individual's opinions, his "rights" or his sense of his importance—is met with a type of reaction that is characteristic the world over and is determined by the superficial nature of this authoritarian "I". Take, for example, such commonplace reactions to a fancied intrusion as petulance, irritation or anger, together with the various and equally superficial mechanisms of agreement for hiding the irritation—"tact" or "politeness" or "diplomacy"—that mark the behavior of man everywhere. Man quarrels, makes up and quarrels again, Since the reactions of groups show the characteristics of the re-

action of the individual,[14] including this conditioned subservience to the " I " image, this type of reaction is characteristic of man everywhere, in home, community or nation. The reaction is not only widespread and commonplace but, singly or in groups, man's behavior shows the same recurrent sequence. He repeats. His behavior is not merely automatic but the basis of his repetition is also the basis from which he attempts to observe his own behavior. Inevitably, his outlook is shortsighted and ill. Despite agreements, pacts, laws, peace-conferences, treaties, the ordinances of Church and the State, man quarrels, makes up and repeats, for this is the nature of human behavior where it has been conditioned to the superficial, self-acquisitive " I " image.

It should be kept in mind, then, that when we are confronted with a prisoner in our examining room, we are studying an individual who, like ourselves, is the resultant of this same continual conditioning process, for the criminal and the neurotic and the law-abiding citizens are all members of the same social structure or society, which, as we have described, automatically conditions all of its members to react affectively and disproportionately to this " I " image. However prevalent throughout society, man's affective response to this image or stimulus word " I " does not represent health or wholeness, for this " I " is a secondarily acquired image which has been inculcated in the individual and superimposed upon the organism's total personality. Though held in common by everyone, this image contrasts each individual with all others. It is the basis of man's self-preoccupation, of his oppositeness, his self-acquisitiveness or competitiveness; in other words, it is the basis of the personality traits which in their extreme form characterize the recidivist.

There is not time to go into the phyletic significance of internal tensional conflict which according to Burrow's investigations produces this conditioned behavior reaction in each individual throughout society.[15] It is sufficient for our purposes in the moment that this conditioned, separative " I " image represents a common denominator for the compulsive, egocentric acquisitiveness of man

[14] Burrow, Trigant, " Social Images Versus Reality ", Journal of Abnormal Psychology and Social Psychology, Vol. XIX, No. 3, Oct. Dec. 1924.

[15] Burrow, Trigant, " The Biological Basis of Conflict," New York, Macmillan & Co. 1937.

throughout the species, including the reaction of the non-criminals as well as the criminals. Civilization's outstanding characteristic and its fundamental anomaly is its systematic training of each individual to get for himself at the expense of others.

At this point the question may well be raised: how does a conditioning process that is universal in its scope, produce a special minority class of individuals whom we know as repeater criminals? We know that repetition is a characteristic of conditions of health; for example, the heart beat and respiration show a very definite characteristic of recurrence, and much of our living shows a very definite periodicity. We dress after much the same routine each morning, arrive at the office at about the same time each day, we meet people and carry on our work, each after his accustomed fashion, and this routine our associates come to know as characteristic of us. Things feel a little odd to us if we do differently. When we attempt definitely to alter our habitual ways of living and acting, we find it unexpectedly difficult. This is evidenced very clearly, to take but one example, in the proverbial frailty of our New Year's resolutions.

But beyond this, man's prevailing conditioning causes the individual organism to function within a configuration that, instead of being organismic and total, is circumscribed by the persistent superficial, autocratic and separative "I" image. In our superficial angers and hatreds or in our agreements, in our wars and in our equally superficial and evanescent arrangements called peace, "normal" man, like the criminal, is himself a repeater of pathological reactions. Naturally, then, if we are all involved automatically in repeated reflex reactions that have to do with oppositeness, self-acquisitiveness and competition, the nature of the behavior of the recidivist is not far to seek, for the problem of the recidivist is but the problem of man's behavior generally.

We might well keep in mind that society has its own crimes which, however, are not recognized as such because they are committed on so large a scale. Society has its mass-homicides called wars, its mass-robberies called invasions, its wholesale larcencies called empire-building. As long as the individual's behavior fits in with the mass-reaction it is considered "good" behavior. As long as he does not question by word or deed the validity of the mass-behavior he may be called a "good citizen."

With all of us law-abiding folk, our familiar pattern of behavior conforms to society's accepted but thoroughly inconsistent and artificial behavior code. It *feels better* to us to continue to live within the law. It is not because of any superior outlay of effort on our part that this is so, but rather because it fits in more with our comfort; this type of behavior is, in fact, automatic—and repetitious—with us. The "antisocial" individuals, however, are those who happen to balk at society's quite artificial though commonly accepted code. The advantages which society promises in return for "good" behavior do not appeal to them as in any way making up for the onerousness of monotonous toil which this program entails; or in certain cases, their aggressiveness may fall outside the mass behavior-pattern. Early in life they find the delimitations of conformity disagreeable or impossible; their reaction pattern is persistent in that special category of behavior that society calls "bad." They react automatically, just as we do, but their habitual reaction happens to be in a proscribed field; hence their particular form of repetition makes them "repeater criminals."

Whenever the repeater is able to put his feeling into words, it is to express a justifiable defense of his action—his right—since he feels that what he has done is in accordance with his own standards and rights. For the most part, even with the intelligent offenders, their behavior is automatic—because it is reflex—whether in revolting against a normal job, or in perpetrating an unlawful job. They act automatically as a direct symptom of society as a whole. In this broader setting, the egocentricity of the overtly antisocial or criminal individual appears in a different perspective. Criminals present merely an exaggerated form of the ego-preoccupation that characterizes the individuals of our "normal" society, and, in our attempt to deal with them, we are confronted with a problem in community behavior.

In the absence of a clear accounting of this community problem, we can only expect the supply of antisocial individuals to continue to pour into our courts and prisons; and we cannot hope that our present legal and correctional procedure will fundamentally alter the behavior reaction of the individuals whom we have called repeater criminals. Our responsibility, then, is to reckon broadly with those factors within ourselves which determine antisocial trends throughout society and of which the behavior of the recidivist is but one aspect.

MENTAL CHANGES FOLLOWING THE REMOVAL OF THE RIGHT CEREBRAL HEMISPHERE FOR BRAIN TUMOR.*

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During the past few years with the improvement of technical methods in neurosurgery, and with the development of increasing hardihood on the part of neurosurgeons, and perhaps their patients, a few cases of very extensive cerebral ablation for brain tumor have been reported. Since the postoperative study of these patients may add to our knowledge of mental and neurological mechanisms, and since such cases are still not common, it seems quite proper to record them. In the present report, interest is centered particularly upon the effects on the mental status of the patient of the removal of a fairly large amount of cerebral tissue.

CASE REPORT.

E. B., white female, aged 38. Hospital No. 5749.

Summary.—Headaches and the roentgenologic finding of calcification in the right frontal region led to the partial removal of a right frontal astrocytoma in January, 1935. Symptoms of increased intracranial pressure, epilepsy and mild mental changes appeared about six months later; and one year after the first operation a second more radical removal of the tumor was carried out. Ten months later (December, 1936), because of headaches and mental changes, a third operation was performed and most of the right cerebral hemisphere was removed. When examined six months after operation, the patient showed moderated emotional instability, slight impairment of recent memory, slight diminution in the normal inhibitions, but little, if any, deterioration in her intellectual ability as measured by mental tests.

Present Illness.—The patient was first seen in January, 1935. At that time she gave a history of progressive, severe headaches for about one and one-half years. Examination showed only a very slight weakness of the left corner of the mouth, and a mild euphoria. X-rays demonstrated extensive calcification in the right frontal region.

First Operation.—January 31, 1935, a right transfrontal craniotomy and partial removal of a right frontal astrocytoma was carried out by Dr. Charles H. Frazier. A decompression was provided.

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* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

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Course After First Operation.—For four months the patient was symptom free. Headaches, petit mal and grand mal epileptic seizures, and more pronounced euphoria then slowly developed. Examination in February, 1936 (one year after the operation), showed some swelling of the right subtemporal decompression, slight haziness of the borders of the optic discs, marked impairment of the sense of smell on the right, hyperactive tendon reflexes in the left arm, and slight weakness of the left corner of the mouth and left arm. Mentally the patient was mildly abnormal in that she was markedly loquacious, excessively cheerful, and even jocose at times. Her intellectual ability on the Stanford-Binet scale was that of a superior adult with an intelligence quotient of 115.

Second Operation.—February 7, 1936, a craniotomy was carried out (by the author) and about two-thirds of the tumor removed before the patient's reaction became so severe that the operation had to be terminated. The mass of tissue removed measured 6 x 6 x 3 cm.

Course After Second Operation.—Complete relief of symptoms was experienced for about six months. The immediate improvement in the patient's psychic state was marked. She became more calm, less talkative and jocose. On a repetition of the psychometric examination, she improved slightly upon her previous score.

About seven months after the operation, however, bouts of severe headache, and more pronounced mental changes began to appear. At times she was greatly depressed about her condition and would discuss various methods of suicide in a half-serious and half-jocose manner. On several occasions she reviewed her various symptoms and problems and future outlook at some length and with the utmost frankness on rather unusual occasions—such as in the course of a telephone conversation with a casual acquaintance, and at a bridge party. She was greatly worried over the prospect of further surgical treatment, but was equally distressed when she contemplated continuing life in her present condition. The over-talkativeness and lack of inhibition grew steadily worse. Nevertheless, the patient's sensorium and general intellectual resources remained fairly normal, although she complained of difficulty in remembering names and dates and even occasionally recent events.

After a discussion with the patient and her family of the risks and possible sequelæ of a third and more radical attack upon the tumor, operation was once more decided upon.

Third Operation.—December 7, 1936. To provide a wider exposure, a small additional bone flap was reflected posterior to the original one. The tumor was found to lie principally in the frontal and temporal lobes and an effort was made to remove these areas without injuring the motor cortex, but tumor was encountered extending subcortically back into the parietal lobe. Accordingly, this procedure was abandoned, and the entire right hemisphere with the exception of the basal ganglia and a small medial portion of the temporal lobe was removed. In the frontal portion of the tissue remaining, there was some suggestion of tumor infiltration. This was removed as widely as seemed possible without encroaching dangerously upon the basal ganglia. (Fig. 1.)

Course After Third Operation.—The cavity, filled with bloody spinal fluid, was aspirated daily. During the second and third post-operative weeks a staphylococcus infection occurred in this fluid, but the patient recovered with no change in therapy other than repeated aspiration and a transfusion. Her convalescence was also slowed by a low-grade osteomyelitis which developed in the small bone flap and necessitated its removal eight weeks after the operation.

The patient was completely hemiplegic on the left side for about seven weeks. At that time she began to make efforts to walk, with support on both sides, and discovered that she was obtaining a return of motor power in the left leg. This improved slowly and with the aid of a brace to support the left knee and ankle, she could walk with only slight aid ten weeks after operation. Touch sensation was lost on the left as well as two-point discrimination, sterognosis, sense of position, sense of motion and vibration, but pain sensation was preserved to some extent in scattered areas and was fairly well localized. The patient showed some limitation of conjugate eye movements to the left and upward for about eight weeks, and had of course a left homonymous hemianopsia (which spared the macula). The hearing was normal on both sides to ordinary testing (watch, whispered voice).

For a number of weeks after operation, the patient's mental state was considerably influenced by a number of changing factors—the operative shock, the blood in her cerebrospinal fluid, changing intracranial pressure, the post-operative infection, the prolonged hospitalization—and was correspondingly variable and difficult to evaluate. For the sake of completeness, however, this period may be briefly reviewed.

The patient showed marked lack of normal inhibitions for some weeks. She was highly euphoric at times, joking excessively, and sometimes very wittily, and always talking with very little restraint. Her mood varied widely and rapidly from time to time and she was occasionally extremely despondent. Her thought content was largely limited to her own situation for a time. The events since operation were poorly recalled, if at all, although older events and even such items as addresses and phone numbers were accurately remembered.

In the course of three or four weeks the patient's reactions became much more normal. While still displaying some lack of restraint in her speech, her inhibitions improved so much that her behavior and conversation were more natural than they had been prior to the operation. Her stream of talk was much less active and her restlessness decreased. The patient's emotional control, though improved, continued to be inadequate (presumably on the basis of operative trauma to the basal ganglia, or their injury in the course of the infection). She occasionally lost control of her voice or broke into sobs, though these outbreaks almost always accompanied a depressing thought content and were not altogether illogical or involuntary. Her outlook broadened so that she took a normal interest in her personal appearance, her home and family, her friends, and the activities of the world at large as portrayed in the daily papers.

Present Neurological Status.—Six months after operation. The cranial nerves are entirely normal with the exception of the left homonymous hemianopsia. The patient is only able to raise the left arm about six inches from her lap, but as the result of considerable physiotherapy the extremity is only moderately spastic and shows no contractures. The power in the left leg is about 75 per cent of normal on individual movements, but with the aid of a brace, the patient walks about the house by herself quite comfortably. The sensory changes are essentially the same as at the previous examinations—pain sense being preserved in irregular areas and being fairly well localized.

Present Mental Status.—

1. General appearance and behavior. The patient is quite particular about her personal appearance, is neat in her dress and toilet. She remains at ease and cooperates well throughout the examination. There are no special mannerisms. (Fig. 2.)

2. Stream of talk and activity. The patient's physical activity is still considerably limited by her hemiparesis. She is out of bed about 12 hours daily, walks about the house freely, spends some time on a small terrace out of doors, and goes for a daily walk or ride in the car. She can walk three to four blocks with slight aid from one person without excessive fatigue. In general she fatigues more easily than formerly, but manages to carry out the above program with little difficulty.

Mentally the patient is quite active. She is in charge of the management of the household (6 members), plans the meals, directs the cleaning, the buying, etc. She spends several hours daily working with her daughters on their school work and is normally worried over the failure of the younger (whose achievements in school are only average) to keep up with her sister (who does superior work). She takes a keen interest in the current events of her neighborhood, the happenings recorded in the newspapers, and reads several popular magazines fairly completely. Her retention of what she reads is sufficient to permit her to enjoy a continued story in a monthly magazine, but she has taken relatively little interest in books as yet. Rather frequent callers at the house occupy much of the patient's time, and with them she converses at some length, with some tendency to loquacity and to dominate the conversation. She maintains an active interest in her neurological and mental progress, as well as in the physiotherapy which she receives three times weekly.*

3. Mood. Emotionally the patient is still somewhat unstable. At times she becomes depressed very easily about her condition, and perhaps once in 24 hours she may weep without any real cause. When her attention is occupied with other matters than herself, she maintains a very even, cheerful mood.

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* The patient received physiotherapy for six months under the direction of Dr. J. M. King. This prolonged and careful treatment certainly contributed much to the recovery of motor power by the patient.

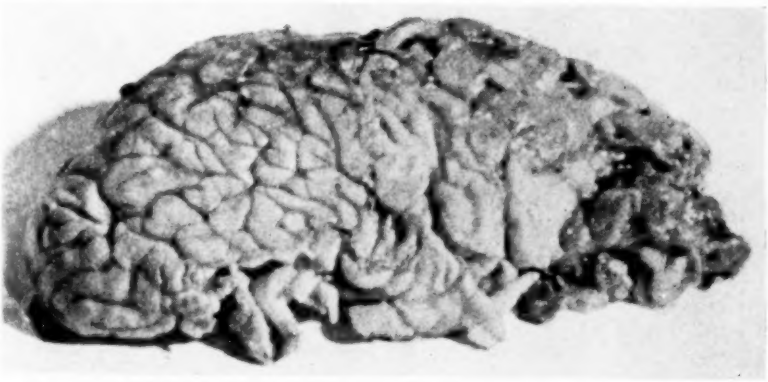


FIG. 1.—Specimen removed at operation. The tumor presented on the surface anteriorly and infiltrated the parietal lobe subcortically.



FIG. 2.—The patient six months after operation.

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4. Thought content. So far as can be determined, the patient has no abnormalities of her thought content. No compulsions, delusions or hallucinations have occurred at any time since operation.

5. Sensorium and intellectual resources. The patient is well oriented in all spheres. Her ability to concentrate in carrying out a test seems about average, but in the course of ordinary conversation she tends to shift fairly rapidly from subject to subject.

Some difficulty in recalling events of several days or weeks previous is at times experienced by the patient, but on testing recent memory and immediate recall there is no deficiency.

As measured by the Stanford-Binet tests, she still is in the superior adult group, with an intelligence quotient essentially the same as that found on the examination one year before.

6. Insight. The patient is aware of her emotional instability, and of the occasional memory difficulties, and is constantly trying to overcome them.

Finally, it seems worth emphasizing that the patient's mental status is still changing—at present improving. What progress or regressions may occur in the future is, of course, unpredictable.*

COMMENT.

In this patient, the only mental changes six months after removal of most of the right hemisphere were (1) mild loss of normal inhibitions with a tendency to over-activity of speech, (2) some impairment of recent memory, and (3) moderate emotional instability.

Unless one assumes a very extreme dominance of the left cerebral hemisphere in man these changes seem astonishingly mild after such severe cerebral insult. A brief review of previous experimental and clinical studies however, makes them seem more plausible. It is true that Lashley,[1] in his elaborate studies with rats found that loss of learning ability following injury to the brain occurrred in direct proportion to the mass of cerebral tissue destroyed, without regard to the location of the lesion. But the careful work of Fulton, Jacobsen and their associates, [2, 3, 4] with chim-

* Eight months after operation the patient has made some further gains. The strength in her left leg has improved sufficiently to enable her to discard the brace and still get about the house easily and take a short walk daily. The patient's mental attitude is considerably improved. She is quite optimistic and cheerful and has a far better emotional control, so that the outbursts of weeping which formerly troubled her, now occur very rarely. She has begun to read books with more enjoyment and seems to have less difficulty with her memory.

panzees and monkeys showed that in the primates unilateral frontal lobe lesions have little if any effect upon the higher mental processes, while bilateral frontal lobectomy caused a profound change—particularly upon mental activities demanding integration over a period of time. Furthermore, in these animals cortical ablations of equal or greater size (even when bilateral) which did not involve both frontal lobes failed to produce a similar mental picture. No evidence of dominance of either hemisphere was found.

The rather meager data as yet available from human cases tend to coincide with those obtained by these latter studies. A few cases of extensive unilateral cerebral ablation have been reported. Dandy [5] has recorded five cases of hemispherectomy for brain tumor. Three of these patients died within relatively short periods so that no estimate of their postoperative mental states could be obtained. One patient lived three and one-half years before dying of a recurrence of his tumor. Of him Dandy wrote, "There did not seem to be any obvious mental impairment. He was always happy and grateful for his extension of life." The fifth patient was described two months after operation as rational at all times, well-oriented, having a good sense of humor, and seeming normal mentally. The patient reported by O'Brien [6, 8] and by Gardner,[7] who lived five years after hemispherectomy, was said to have shown no mental abnormalities whatsoever, although no exact studies of her intellectual level before or after operation were carried out.

In addition several studies of bilateral frontal lobe lesions are available. Ackerly [9] studied carefully the psychic changes in a case operated upon by Spurling—a woman whose left frontal lobe was severely compressed by a large mid-line meningioma, and whose right frontal lobe was removed to permit the extirpation of the lesion. In this case, two years after operation there was no significant diminution in intelligence, no disturbance in the emotions or in general behavior, except a certain lack of distractibility, or tendency to an increased concentration upon the task at hand. It is not known of course, how much function may have returned in the injured frontal lobe following the removal of the tumor. One reason for suspecting the return of function on the left is the report of much more incapacitating mental deterioration in the case studied by Brickner.[10] This patient, both of whose frontal lobes

were removed by Dandy, showed as his fundamental defect a quantitative diminution in the ability to synthesize—which in turn led to considerable loss of intellectual power and great alteration of the personality.

Finally, the operations carried out by Moniz [11, 12] and by Freeman and Watts,[13, 14] for the relief of certain abnormal mental states involve the bilateral destruction of varying amounts of frontal lobe white matter. The procedure is reported to have greatly improved the psychotic states (particularly agitated depressions), without any marked change in the intellectual level, and with only occasional transitory effects on other mental functions. It is of considerable interest that these relatively small bilateral frontal lesions should produce such marked psychic alterations.

In summary, it would seem that the evidence available at present suggests that the higher cerebral functions in man are less dependent upon the integrity of the cortex as a whole than upon the preservation of the frontal lobes—a conclusion which is supported by the effects of hemispherectomy in the case here reported.

SUMMARY.

1. A case of removal of the right cerebral hemisphere for brain tumor is reported.

2. From a neurological standpoint, the return of considerable motor function and some sensory function on the opposite side of the body is of interest.

3. Mental changes including impairment of recent memory, emotional instability and diminution in the normal inhibitions, are present six months after the operation, but the patient's intellectual resources, personality and ability to meet the demands of her daily life have not been greatly altered.

4. The relatively mild mental changes resulting from hemispherectomy in this case are in keeping with previous experimental and clinical studies which indicate that in primates and man the higher cerebral functions are more severely altered by bilateral frontal lobe injury than by corresponding or even more extensive lesions of any other areas.

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DISCUSSION.

DR. LLOYD J. THOMPSON (New Haven, Conn.).—A point more or less covered by Dr. Alford, was that we really don't know the condition remaining. We have a rather discreet removal of brain tissue here, but there is a possibility that what is left is not quite normal as yet. Maybe it will be sometime, but when we think of the pressure, the edema, and the infection that has occurred, there is a possibility that the other hemisphere, and perhaps the basal ganglia, may have suffered in some way.

I bring out that point because these mild personality changes that have been noted may be those that are seen in bilateral frontal lobe conditions,

and in time perhaps they will disappear, as in Ackley's case. Perhaps later we will have evidence that the unilateral removal of the frontal lobe and of the one hemisphere may really be as the clinical reports and the experimental work has intimated that the person can do very well without that side of the brain.

I don't know what Dr. Rowe's plans are for the future in studying this case, but I hope that my suggestions will be of help. In a case as important as this, there should be a combined effort on the part of neurologists, psychiatrists and psychologists. Dr. Rowe pointed out that some of the important cases of the past had missed being studied in the proper way afterwards. I don't think any one man can look into all these fields as well as they should be, and that is a suggestion that I make.

The routine mental status as we examine in cases of psychoses, and the ordinary intellectual intelligence tests are not enough, and I think that psychiatrists and psychologists and neurologists can go quite a way in bringing into a study of this sort more refined techniques and a broader point of view than has ever been used in the past.

A psychiatrist, of course, is interested in the patient like this from the standpoint of the whole individual and his adjustment to his environment and his culture. We can analyze the personality, breaking it up into a study of the impulse life, what is happening to that, temperament, and in that particular field we see evidence in these lobectomy cases that something does happen in that particular field. Then we could go on and study the character of the field.

Put in different terms, and looked at in a different way, I think our psychoanalytic colleagues would be interested in a case of this sort to see what happens to the id, the ego, and the super ego. We picture the super ego as up there in the cortex, and from a psychoanalytic point of view it would be interesting to see if any light can be thrown on it.

There is one symptom in which I am particularly interested, it occurs in these cases as well as others, and that is the hyperkinesis, this overactivity that occurs in reported cases of lobectomies and various other discreet removal of brain tissue, post-encephalitic cases, tumors, and so on. Some light might be thrown on that particular symptom from a careful study of a case of this sort. That patient did show it occasionally from time to time, I believe, but it seems to be quieting down.

I suppose the question is the release of the basal ganglia from cortical inhibition, but I am under the impression it is a much more complicated thing than that. From the standpoint of psychology, I am sure the ingenious clinical psychologist can help in organic brain cases, and particularly in these cases.

There was mention of the memory being preserved in Pick's disease. With the aid of Dr. Miles, our psychologist, we were able to show quite definitely that although clinically to us the patient looked to be definitely failing in memory, there was a much greater memory retention than appeared to the clinical observer, but the use of that intelligence as an intellectual tool was impaired.

The synthesizing of the intellectual functions can be elaborated to quite an extent by the clinical psychologist.

The question of cortical dominance in a case like this is of tremendous interest. If this patient happened to have been, let us say, left-eyed and right-handed, a study of the combinations that you might get out of that would be interesting. It could help, probably, in the work that Dr. Orton is doing.

Then there is one other psychological thing which is psychiatric, and that is the Ronchese test. It would be interesting to see what that shows. I have had the opportunity of observing Dr. German's cases, and I have seen a good many of Dr. Fulton's monkeys, and I agree with the general impression that Dr. Rowe gets here, that unilateral lobectomy doesn't do much damage to the total personality.

I don't think we can say that there is any one psychological symptom that is characteristic of frontal lobe or unilateral hemisphere function, and I don't think we can say there is any one clinical picture that is characteristic of disease of one side, or of removal of one side.

Holmes has pointed out that there are several clinical pictures that may come with such involvement, and I think it depends a lot on the personality, and that means that we study the original personality.

One more point is that in the description of cases similar to Dr. Rowe's, whether it was unilateral or bilateral removal, that we don't seem to get a picture resembling schizophrenia. We get pictures resembling all sorts of other things, but nothing that gives a clear-cut picture of a schizophrenia. That makes us stop and think whether we will ever find the answer to schizophrenia in definite brain pathology.

Dr. Stuart N. Rowe (Western Pennsylvania Hospital, Pittsburgh, Pa.).—I thank Dr. Thompson for the discussion, and particularly for his suggestions as to the further study of the patient.

I have already enlisted the aid of the psychologist. I won't say I have gotten as far as the psychoanalyst, but since the patient has survived at the hands of the neurosurgeon, I think she would be willing to face any further tests of the psychoanalyst.

DEFECTS OF INTELLIGENCE FROM FOCAL LESIONS WITHIN THE CENTRAL PART OF THE LEFT CEREBRAL HEMISPHERE.

By LELAND B. ALFORD, M. D., St. Louis, Mo.

Thirty years ago Pierre Marie [1] in communicating the theory of aphasia, to which his name is attached, expressed the view that a defect of intellectual functioning is produced by lesions within a certain area (roughly posterior central in location) of the left hemisphere in right-handed persons. Many clinicians doubtless have observed that apparently without any constant relation to the extent and severity of the lesion or even the degree of aphasia, cases of right hemiplegia exhibit a wide variation in the extent of the accompanying intellectual involvement. Apparently, therefore, certain parts of the hemisphere are more particularly concerned with the intellectual functions than are other parts. Since recent contributions of brain surgery have served to throw a new light on the whole subject and incidentally have disclosed new avenues of investigation and since the implications of Marie's contribution are obviously both broad and important, the present writer decided several years ago to make further studies along the line indicated.

The points under investigation, consequently, have been the occurrence or not of intellectual defects with focal lesions, the nature of the defects and the location of the respective lesions. Although the evidence presented is not in all respects complete and conclusive, it now appears that the point made by Marie was well taken and eminently worthy of further development.

Psychiatrists are familiar with such pictures of intellectual disturbance, produced by diffuse processes, as are represented by the terms " dementia," " confusion " and " clouding of consciousness." Further the phrases which neurologists employ in connection with aphasia like " loss of inner speech," " agnosia " and " semantic " defect also imply intellectual disturbances, but of a limited and specialized kind. The former offer the analogies which are useful in the present relation, the latter being of interest chiefly as com-

plications that occasionally must be discounted in judging underlying mental states.

The criterion adopted for deciding about the involvement of mental functioning was therefore the composite clinical picture of clouding, confusion and disturbance of memory. It would be possible to resort to the quibble that any limitation of attention, memory, or initiative constitutes a defect, but such changes are far from being the generally *abrupt* and *distinct* changes that constitute defect in the accepted sense.

A point to be kept in mind in this connection is the decisive value of negative over positive findings. *It is no exaggeration to assert that many observations in this field, for instance those recording the mental changes accompanying tumors, are misleading because of failure to recognize this fact.* Transmitted pressure, circulatory changes, edema and other physical alterations in the intracranial status, as Dandy rightly observes, can affect functions surprisingly at a distance from the lesion itself; but in the absence of a mistake as to handedness or an anomaly the negative finding is conclusive. Some have found it difficult to accept Dandy's negative findings following massive excisions, but the writer has experienced no such skepticism for the reason that after weighing positive against negative evidence in a series of cases, he had already arrived at similar conclusions on several of the points. One can only be reasonably safe in accepting positive findings when the lesion is limited in size, destructive in nature and has been in existence for some days.

In these present studies, further, due regard has been given to complicating factors, such as aphasia, apraxia, shock, weakened condition and general arterial change. The difference between willed and impulsive responses often referred to in the literature of aphasia likewise has proved to be an extremely important one, the latter doubtless being the more accurate as an index when patients are apraxic or easily confused (see Cases 2 and 4 below). After gaining experience one becomes able to recognize and discount these interfering features in reaching conclusions about the degree of defect in situations that are not always simple.

Negative Evidence from the Literature.

Dandy's [2] original conclusions are so cryptic that they can appropriately be quoted *in toto:*

(1) It is possible to remove all of the right cerebral hemisphere above the basal ganglia with no appreciable disturbance of mentality; this procedure has been carried out on several occasions for the removal of extensive tumors in the right hemisphere.

On one occasion both frontal lobes have been completley extirpated for the treatment of a bilateral frontal brain tumor and following this there has been no appreciable disturbance of mentality. The patient is perfectly oriented as to time, place and person; the memory is unimpaired; he reads, writes and conducts mathematical tests accurately; his conversation is seemingly perfectly normal.

(2) Furthermore by the excision in other cases of the left occipital lobe and of the lower third of the left temporal lobe, we can be sure that none of these regions are responsible for intelligence. The intellect, therefore, is concerned with the remaining portion of the cerebral hemisphere and is doubtless closely related to the speech mechanism.

(3) It has been found after ligation of the anterior cerebral artery on the left side that consciousness is completely and forever lost. This does not result when the same vessel is ligated on the right side. There is, therefore, within the limits of distribution of this vessel an area specifically concerned with consciousness. The same result follows when this vessel is occluded at the middle of the corpus callosum, indicating that the seat of consciousness is posterior to this point in the vessel.

(4) The entire body of the corpus callosum may be split in the midline without any appreciable disturbance of function. This structure is, therefore, eliminated from participation in the important functions which have hitherto been ascribed to it.

Dandy [3] also states that no disturbance of "consciousness" or other essential mental defect was observed after excisions of the whole of the left temporal lobe, the occipital lobes, either or both, or (apparently) the left occipital lobe, the supramarginal and angular gyri (in large part) and a part of the temporal lobe posteriorly (the incision being "vertical and slightly behind the postcentral gyrus"); although he encountered the complications of temporary anomia in the first instance and permanent visual aphasia and agraphia in the last. Thus Dandy's excisions gave negative findings as regards mental defect after the whole of the right hemisphere down to the basal ganglia and optic thalamus and all regions of the left hemisphere excepting that under consideration in the present discussion had been excised.

Dandy's assertions have received noteworthy corroboration as follows: In O'Brien's and Gardiner's case [4, 5] the entire right hemisphere was removed down to the central gray masses and the patient survived for almost five years. It is stated that relatives and friends could detect "no alteration in personality or intellectual abilities" and that "her memory for recent and remote events was good and she read constantly." To be brief, the patient appeared to expert observers and to her family and friends to be normal and unchanged mentally and emotionally except for an occasional slight apathy.

Other confirmation comes from Penfield and Evans [6] who report on the removal of the frontal lobes. After one large left frontal removal, in which the incision crossed Broca's area, there was no residual speech defect and mentality was preserved except as to the minor details of the ability to do mental arithmetic and to play bridge and perhaps as to initiative. A smaller left frontal excision was similarly negative. These workers, as well as Dandy, place the functional part of Broca's area somewhat farther back than is usually done.

It will be observed that excision of the right hemisphere does not take into account the great central nuclei—the lenticular and caudate nuclei and the thalamus—and immediately adjacent structures. The writer [7] attempted in 1933 to investigate these structures through the medium of left hemiplegias of vascular origin wherein the lesions, according to statistics, are likely to be located among these structures in a large majority of instances. Fifty cases taken at random from material at an infirmary were all negative for intellectual involvement, while 50 control cases of right hemiplegia yielded a very different result. Numerous observations since that time have disclosed that it is rather rare to find mental defect with left hemiplegia. Hence the entire right half of the brain from cortex to base can be eliminated as the primary source of basic mental defect.

These negative results, which, as has been explained, are highly conclusive, have narrowed the space where lesions will affect fundamental mentality down to that now under investigation. One cannot fail to admire Marie's clevereness in so exactly delimiting with the limited resources at his command the significant area of the brain.

The problem is now confined to the investigation of the effects of lesions within this remaining area—an extremely convenient limitation.

Clinical Studies of Cases of Vascular Accidents.

It occurred to the writer that now that the part of the brain to be studied was confined to the middle portion of the left hemisphere, the vascular accident with right hemiplegia afforded a useful source of material. The lesions in this condition were known usually to be situated within this area, often to be limited in extent and, as indicated by the variations in symptomatology, to vary somewhat in location. The destructive lesion, it seemed further, should present a minimum of pressure and circulatory effects on surrounding structures, especially after the lapse of some days. Accordingly material of this nature has constituted the chief source of data.

A review of the clinical findings may be presented in summary form as follows:

(1) Hemiplegia is seen without aphasia or mental involvement of noteworthy degree. This occurs in perhaps a third of the cases, a great majority of which undoubtedly belong in the right-handed group. One instance of this kind may be mentioned:

> The patient, a man of 48, with myocarditis, suffered right hemiplegia of gradual onset that became almost complete. On not a single day did the patient fail to attend to some business matter. He went through a period of several months of mild emotionalism and for a year was rather excitable and easily fatigued. Now, two years later, he is putting in a full day of very responsible work as the head of a large institution, although there is still almost no movement in the hand and foot and movements of proximal parts of the arm and leg are very limited.

(2) Sensory disturbance of the affected side was encountered in only two instances when mentality was unaffected. This fact perhaps indicates a spatial relationship between the sensory and psychic structures in the brain and therefore constitutes an aid to localization.

(3) Emotional disturbances occur both in the presence and in the absence of intellectual defect. Excitement and restlessness are not uncommon during the stage of shock from severe lesions of acute onset and also sometimes occur with defect of intelligence when shock does not appear to be a marked factor.

Forced or facile weeping is rather common in association with the milder forms of intellectual defect and perhaps is observed also when the defect is very slight or absent. An especially interesting observation was the occurrence in the absence of much or any defect of a state closely resembling the depressed phase of manic-depressive psychosis, that lasts several weeks or months and then passes. These emotional disorders were taken to be aspects of the thalamic emotional syndrome.

(4) The matter of the interrelation of intellectual and speech defects has a bearing on the important theoretical question of whether the two are inextricably combined or are distinct affections. Mixtures of the two are certainly common and difficult, but after some experience, not impossible to evaluate as to the relative entrance of the one and the other factor. It is, however, on the individual case which is less complex that we have to rely in deciding the question mentioned.

It has long been stated that the so-called sub-cortical asphasia is a type of motor speech disturbance in which the intellect remains almost, if not completely, normal (see Case 2, below). Recently Kennedy and Wolf [8] in a very interesting and instructive article have affirmed, after detailed studies, the validity of this statement. Jargon aphasia, too, as indicated by Case 4, below, may be accompanied by but slight basic intellectual defect.

The converse of this situation, namely the existence of intellectual involvement in the absence of aphasia, is even more difficult to establish; for one reason, because when the defect is at all marked speech becomes limited and utterance is apt to be indistinct. But if one is willing to accept relevant answers to a number of questions as showing the essential absence of aphasia, then certainly defect not rarely occurs with little or no aphasia. On this point Dandy asserts: [3] "Moreover many patients with central lesions talk and understand speech perfectly, but the mind is badly affected" (p. 56).

The indication, therefore, is that speech and intellectual defects are, at least in large part, separate and separable affections.

(5) The depth and nature of the defect are obviously problems of importance, but as further studies on this subject are contemplated, it will not be considered in detail here. It may be said, however, that certain difficulties attend such a study, among which are,

first, the tendency of patients with much defect to succumb early, even before the stage of shock is probably past; and, second, the continuous improvement which the intellectual defect like the hemiplegia often undergoes. It is still a question whether the more profound and permanent defects are not the result of multiple lesions; nevertheless there is little doubt that defects of all lesser degrees from focal lesions can persist indefinitely.

The character of the defect varies so much from patient to patient that it can almost be said that each case is a law unto itself. Dullness, clouding, confusion and stupor, as these terms were understood, as well as states not easily defined, are encountered in all degrees and combinations. (Memory loss is no absolute index to the degree of involvement, as might be expected.) The obvious conclusion would be that what we call intellectual defect is made up of several elements; although these elements would be of a similar order in their bearing on mental functioning.

To summarize, defects from focal lesions occur and can persist in all degrees up to the most profound; and defects as encountered are probably made up of a number of related elements.

From these clinical observations, therefore, it appears that hemiplegia occurs without speech or mental defect, but that sensory disturbance in such circumstances is rare; that emotional upsets, probably of thalamic origin, are encountered both with and without defect of intelligence; that motor and probably also jargon aphasia can exist without much or any intellectual disturbance and that, conversely, a high degree of intellectual impairment occurs in the absence of marked aphasia; and that the defects themselves, although conforming in general to the type known to psychiatrists, are both variable and difficult to evaluate and probably are composites made up of a number of related elements.

A general conclusion, therefore, is that the intellectual defect occurs in certain, but not all, cases of hemiplegia and of aphasia and that defect from focal lesions comprises, at least in part, a separate and distinct disturbance or group of disturbances. These clinical observations on numbers of cases, although in the absence of post mortem examinations to be viewed with caution, still serve to delimit and to clarify conceptions of essential intellectual defects.

Clinical and Pathological Studies of Cases of Right Hemiplegia.

Case 1.—*Large lesion that cuts off the cortex of the parieto-central lobe, leaving the great nuclei as the only functioning structures of the area under consideration. The patient very unresponsive, but facial expression maintained and a few quite complex mental responses carried out.* (Figs. 1 and 2.)

The patient, a vigorous 58-year-old professional man was stricken with a right hemiparesis that did not become complete for six days. The general condition, except for occasional spells of weakness, was good up to three days before the end. Aphasia was complete from the start. Duration of illness, 14 days.

The mental state was practically the same throughout. The patient's facial expression of alertness was maintained and the eyes moved automatically, at first glance giving the impression of actual fixation. The unaffected hand alternately rested upon, smoothed or drummed on the bed covers, touched the head or otherwise employed itself as if purposefully. Whenever the patient was embraced by a close friend, the hand rested naturally upon and gently patted the other's back. A light flashed into the eyes caused no winking and no fixation and pin pricks and loud comments seemed to provoke no response at all. Yet the patient frequently pulled out the nasal tube and a dose of salts was spewed forth violently with an expression of extreme disgust. Potassium iodide was also refused. The demeanor as a whole suggested an absent-minded or abstracted mood. Observers differed widely as to the degree of understanding retained.

In the midst of this generally unresponsive state, however, occurred a few mental responses of some complexity. The patient regularly took fluids through a tube when asked to do so; and when the time came to turn him in bed, he would, to command, assist so effectively that one nurse was able to complete the operation. When one grasped the hand in a handshake and asked the patient to reciprocate, there was a gentle return pressure and then the fingers toyed absently with one's hand. Finally when close friends greeted him, a greater animation seemed to be displayed than when the person was less well known.

This case probably corresponds to the two of Dandy in which the frontal artery was ligated,[3] the different picture probably being assignable to the difference in rate of onset. Certainly there was not the complete and permanent unconscious condition which Dandy describes in his cases. Apparently the patient retained a good deal of mental functioning, since the responses indicated some activity of the faculties of hearing, comprehension, kinæsthetic sensibility and motor coordination, and this despite the fact that the large and recent lesion nearby must have markedly dampened all such activities. As a large part, if not all, of the parietal cortex was directly

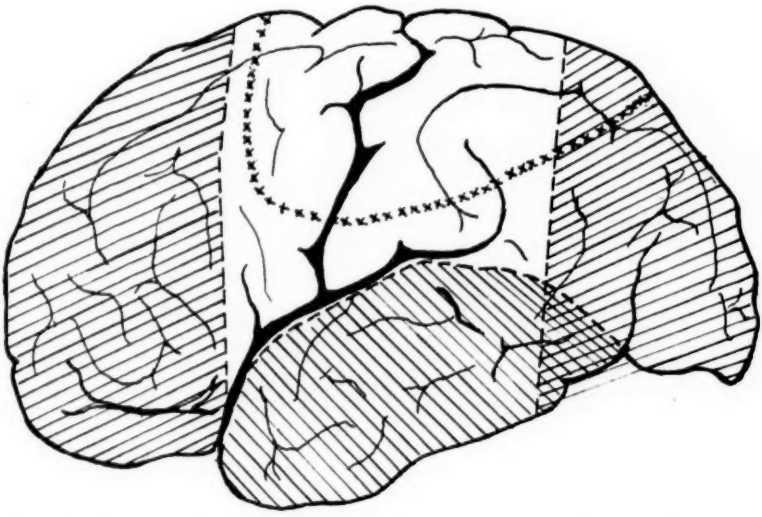


FIG. 1.—Drawing taken from Dandy.[3] The shaded areas represent different surgical excisions. The unshaded area and underlying parts are therefore the structures under investigation. The line of crosses has been added to indicate the projection on the surface of the limits of the lesion in Case 1.

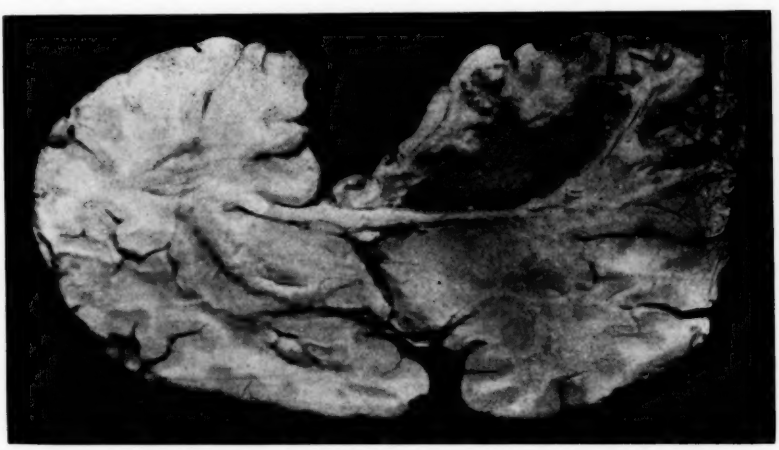


FIG. 2.—Photograph of cross section of brain, Case 1.

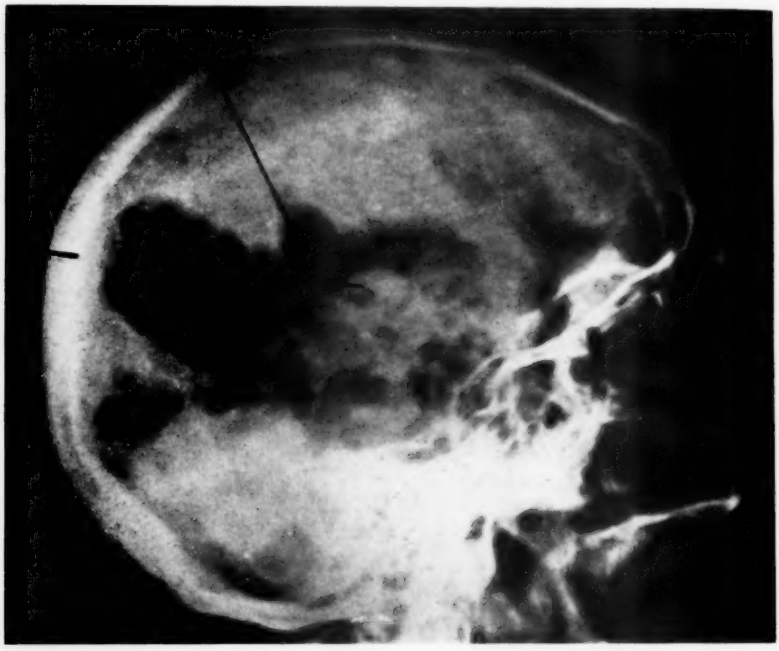


FIG. 3.—Encephalogram, Case 2, showing two areas of destruction. The lines drawn in show approximately the positions of the Rolandic and Sylvian sulci.



FIG. 4.—Encephalogram, Case 2, antero-posterior view.

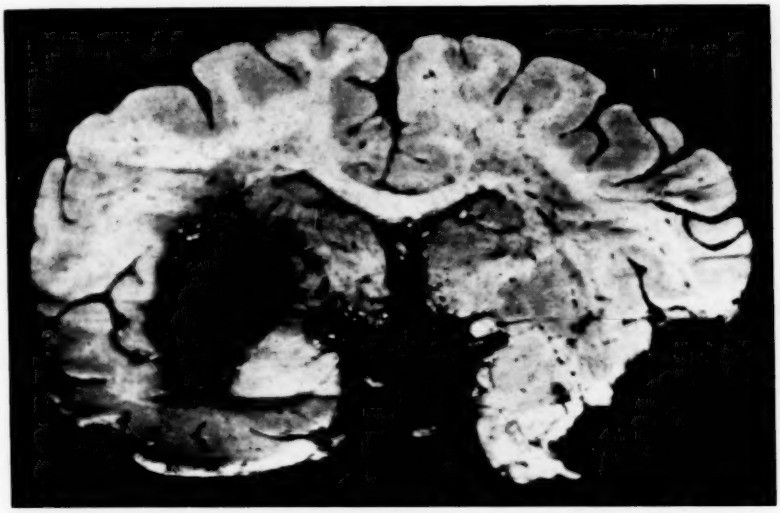


FIG. 5.—Photograph of the hemorrhage, Case 3.

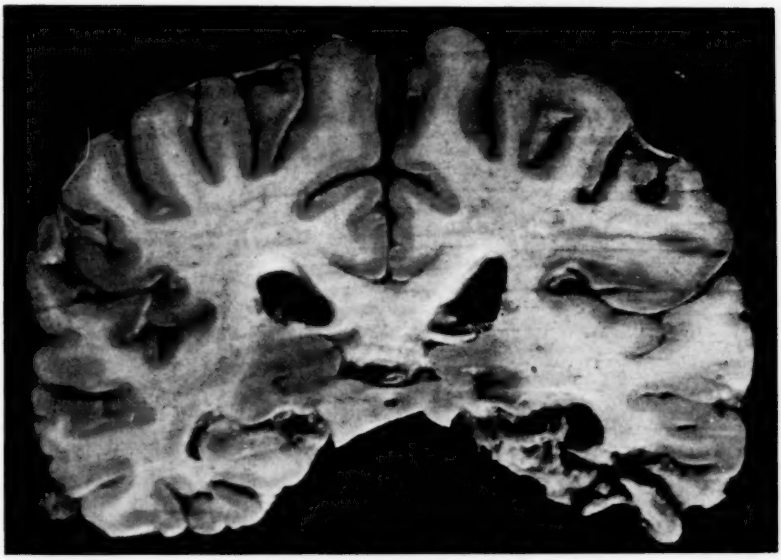


FIG. 6.—Case 4. Note softenings of (1) basal surface of left temporal lobe, (2) thalamus and (3) (slightly) of parietal lobe.



FIG. 7.—Reconstruction on a horizontal section of the softening and hemorrhage, Case 6. The parallel lines represent clot.

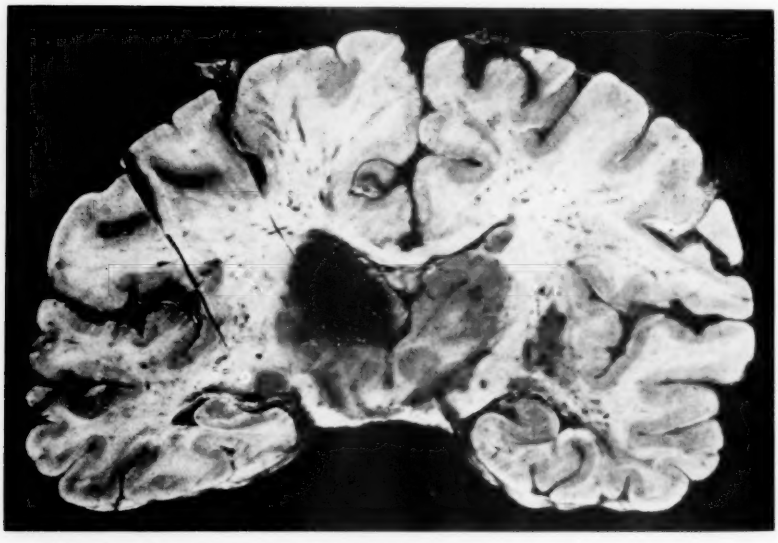


FIG. 8.—The hemorrhage in the thalamus, Case 7, at its largest part.

or indirectly (through edema and pressure) cut off, the conclusion would be that normally a considerable amount of mental activity takes place in the corpus striatum, thalamus and adjacent structures.

Incidentally the writer believes that the alert expression with or without the automatic eye movements is characteristic of preservation of the basal structures and is therefore of clinical, localizing value.

CASE 2.—*Encephalograms show large parieto-occipital and lower central lesions. The patient had almost complete motor aphasia, marked apraxia and a tendency to momentary confusion; yet he conducted extensive business affairs and in many ways displayed great mental acuity.* (Figs. 3 and 4.)

This amazing patient, a business man aged 60, had been stricken with apoplexy 20 months before the x-ray picture was made. His speech was confined to one expression of two words, which was frequently repeated, and to swearing when he was angry. The paralysis had improved only slightly and was still almost complete. He was markedly apraxic, even gestures often being incoordinate (though less so when involuntary or impulsive) and so easily confused that when under examination, his responses quickly became irrelevant and unaccountable.

At first the patient put out his tongue and touched his nose on request, but a moment later was unable to do so. Then he performed correctly the motion of turning a key and when a newspaper was handed him, he turned it right side up and glanced towards the headlines. But when shown a knife, watch, etc., he acquiesed whether the right or a wrong name was spoken. Told to write his name, he merely made a few scratches, but when told to write the name for a watch shown him, ended by trying to write his own name, although not succeeding. Asked to write the name of a finger ring shown him, he did nothing at all, and he could not indicate or write the value of various coins held before him. Then when shown a watch face and asked to write the time, he first wrote his name fairly legibly (perseveration), but slowly and with difficulty and finally an incorrect time in figures.

The history, however, told a very different story. This patient conducted his business affairs and managed several farms, through an agent who consulted him, and somehow made his desires known by the incoordinate gestures. Some months since he drew a plot of some farms which was without an error. He plans days ahead to visit a particular friend and when he happens to be in the neighborhood, does so. On one occasion the mysterious disappearance of cigarettes was the subject of discussion in the family circle and the patient eventually detected the culprit, an employee. Again when all were trying to recall the name of a certain person, the patient by his reactions disclosed that he was trying to let them know it. Eventually, in his excitement, the correct name came forth. Once when his nurse was startled and jumped at an unexpected sound, he laughed long and heartily. It was stated

that his mood is generally happy, although he can become very angry, and that he feeds himself unaided and propels himself everywhere in a wheel chair.

This patient's mentality undoubtedly is excellent and this in the presence of almost complete motor aphasia, marked apraxia and tendency to momentary confusion, and of lesions that cut off the visuo-psychic and other parts of the parietal and central cortex and destroy a large amount of the underlying white matter. The complicating factors mentioned and the difference between the accuracy of willed and impulsive responses account for the erroneous impression at first given by the examination.

The areas of destruction, as shown, are large, but no doubt are larger than those disclosed in the x-ray, which is merely the space from which, for some reason, the debris had escaped. The case, therefore, substantiates the conclusions drawn from the preceding one as to the comparative participation of cortical and basal structures in mental functioning. It also illustrates excellently the retention of mental capacity in the presence of almost complete motor aphasia. Altogether the case is an extraordinary and highly instructive one. (Permission to present this case has been accorded by Dr. W. T. Coughlin of St. Louis.)

CASE 3.—*Hemorrhage measuring about 2.5 x 2.5 x 5 cm., lying anteriorly and involving a small part of the caudate nucleus and a good deal of both the lenticular nucleus and island of Reil. Almost complete hemiplegia and marked hemianesthesia, but no aphasia and normal mentality.* (Fig. 5.)

The patient, a 48-year-old colored man, survived 21 days after being picked up in the street. The blood pressure was 220/140 and the physical condition was poor, the patient being emaciated and weak. The only movement that developed in the paralyzed side was a slight one in the leg. Sensation could be easily tested and marked hemianesthesia was demonstrated. No aphasia or apraxia was present. The condition remained almost stationary up to the second day before demise when the patient suddenly became weak and lost consciousness.

During the first day the patient was said by the interne to be stuporous and unable or disinclined to talk, but thereafter he was alert and mentally normal throughout. He conducted conversations on a number of subjects at different times and always responded quickly and accurately. His memory was excellent and he could follow a train of thought and draw conclusions as well as anyone of his station and race. He was quiet and unemotional. All commands were executed promptly and accurately. One could find no defect at all in the course of the type of examination which was used with such cases. He asserted that he was completely right-handed.

This case is interesting as showing where at the base a lesion can be located to cause hemiplegia without accompanying aphasia or mental involvement. Evidently some of the findings, such as the hemianesthesia, were effects at a distance. How speech escaped is rather a mystery. The case may be a type for those patients with right hemiplegia and normal mentality.

CASE 4.—*Large lesion involving the basal surface of the temporal lobe, smaller lesions affecting superior parietal gyrus and optic thalamus, very small lesion in second frontal gyrus. Typical jargon aphasia; mentality very good, but easily confused.* (Fig. 6.)

The patient was a 68-year-old, professional, white man. Onset of illness 20 weeks and beginning of observation 15 weeks before death. The physical and mental conditions varied little. For several weeks there was a typical jargon aphasia and thereafter the only vocal responses were an occasional "yes" and "no"; but gestures remained normal throughout. There was some apraxia for simple voluntary acts. The paralysis was partial in the beginning, but gradually became complete (flaccid) in the arm and almost complete in the leg. Sensation was easily judged by the facial expression and was markedly affected. The patient was said to have himself discovered his hemianopsia and tried to tell about it, before the doctor found it. His mood was at times lachrymose and he was at times rather drowsy. Unless accosted he was quite apathetic, although his appearance was one of alertness.

The patient obviously recognized all visitors and the family were sure they could tell when he particularly liked or disliked a caller. He invariably greeted his physician with a nod of recognition, a wave and the extension of his hand. He apparently recalled visiting the physician before the onset of his illness and being visited by him a few days previously. Some sample reactions are as follows: Asked who the doctor was there was a deprecative smile that stated, "what a foolish question"; and questioned as to how he was, the response was a grimace of futility that expressed, "what can one say in my condition?" Once when his beard was being discussed and he was asked if people had not occasionally taken him for a rabbi (a family joke), he replied with a prompt and vigorous nodding. He recognized the portrait of his daughter among several shown him. In addition he answered questions as to pain and for a time indicated when he required the bed pan.

But any succession of questions quickly confused the patient and "or" sentences were never grasped. The short simple remark or question seemed nearly always to be understood.

Post mortem there were the following areas of softening: (1) a large area involving all the basal surface of the temporal lobe up to 2.5 cm from the tip and extending as deep as the ventricle; (2) a band-like zone in the superior parietal gyrus adjacent to the angular-supramarginal gyri and involving a part of the latter; (3) a very narrow linear band of small extent just under the cortex of the second frontal gyrus posteriorly; and (4) an area 1 x 1 x 2.5 cm. in the lateral nucleus of the thalamus. The basal vessels were solidly calcified.

The mentality in this case was apparently very good if one accepts the impulsive response as a criterion and does not demand a consecutive train of thought. Retention of remote and recent memory and a grasp of many, albeit simple, questions and remarks would seem to imply as much. Certainly there was little of what is called clouding or confusion in the mental state. Evidently then there can be very good mentality in the background of jargon aphasia even though the patient does not seem to be aware of his speech disturbance. A final feature of interest is the exclusion of a part of the lateral nucleus of the thalamus from a rôle in the production of intellectual defect in the sense adopted for these studies.

CASE 5.—*Poor preservation, but apparently bilateral moth-eaten condition and scattered small areas of softening in the base. Cortex grossly normal. Little aphasia. Marked dementia.*

Sudden onset of right hemiplegia in a negro man of 74 years. The condition changed little during the 43 days between onset and death. The patient was able to speak some few words understandably in a hoarse whisper and attempted to speak others that could not be made out. He gave his name and repeated words after the examiner. He attempted to execute simple commands such as touching his nose and putting out his tongue, but rarely was completely successful. He laughed slightly when stuck with a pin and obviously felt the pricks more strongly on the left side. He seemed to recognize his name among several pronounced. There was no response unless the demand was simple and spoken in a loud voice. Little stupor or drowsiness was evident. He had to be fed at all times and evacuations were involuntary.

The autopsy had been performed four days post mortem and the brain markings were indistinct due, no doubt, to poor preservation. The great nuclei, particularly the thalami, were apparently moth-eaten and atrophic and a number of areas of partial softening of less than a centimeter in diameter appeared to be present. There was no definite softening of any size. The cortex was better preserved and was approximately normal. The larger arteries were solidly calcified.

(In a similar case, the patient was 65 and the mental changes at first less marked, but gradually becoming more pronounced. Total duration of illness nine days. The pathologist was able to find no gross lesion at all, only an "edema.")

Unsatisfactory as this case (and the other) is, it suggests several instructive points. In the first place sudden onset, particularly in the aged, evidently does not establish the existence of a single, limited lesion. Again hemiplegia and perhaps mental defect may be caused by extremely small lesions. Finally it may be found that the most profound and permanent of defects are associated not

with single, but with widespread and bilateral processes in the basal structures. The case is, therefore, useful in putting us on our guard.

CASE 6.—*Band-like hemorrhage and softening, approximately 1.5 across, 2.5 cm. high and 6 cm. long in the greatest diameters, running antero-posteriorly and involving all of the central nuclei. Partial hemiplegia. Moderate to marked mental confusion. First positive case* (Fig. 7.)

The patient was a negro woman, aged 29, with the blood pressure 225/150, negative blood, spinal fluid and urine tests, and the history of a sudden stroke three days before entry. Speech was said to have been affected at first, but upon entry she could give some of her personal history, although not entirely clear mentally. She quickly became drowsy and more confused. The evacuations were involuntary throughout and she had to be fed almost from the beginning. The spinal fluid on the second and seventh days was clear. On the eighth day the blood pressure fell to 100 and the patient became stuporous, dying on the ninth hospital day.

Examined on the fourth day the paralysis was found to be definite, but not marked. Sensation could not be tested owing to the mental state. General condition excellent. The patient was drowsy, but could be aroused. Her capacity to speak was retained at least to a large extent, but she was quite unresponsive and disinclined to talk, such answers as were obtained being generally in monosyllables. She could give her name and even was able to state that she had suffered a stroke a few days before. She recalled having seen previously two or three of the doctors and nurses present, but it was not certain that she recognized their function or the nature of the institution. She would execute slowly, but sometimes only after repeated commands such simple actions as touching the nose and putting out the tongue. The patient's disinclination to respond and cooperate in any way interfered decidedly with the examination. The conclusion at the time was that she was "considerably confused." The nurses and doctors in attendance agreed that she had been markedly drowsy and mentally affected certainly after the first day or so. On two or three occasions she had failed to recognize visiting relatives. Altogether the evidence definitely indicates that the mental confusion was from moderate to marked in degree.

Post mortem, besides the lesion itself a liquid mixture of blood and spinal fluid was found in the ventricle and a small, soft, unattached clot in the posterior horn. The cerebral arteries were not calcified or thickened.

The lesion in this case is of limited extent and destructiveness and we may safely conclude that the mental confusion was due largely to the actual destruction with perhaps some slight reaction on immediately adjacent tissues. The post-mortem findings of blood in the ventricle and of the small clot in the posterior horn probably originated coincidentally with the fall in blood pressure the day before death, since the spinal fluid two days before death

was clear. The case, therefore, is important as showing one locality in which a limited lesion can lead to definite mental confusion.

CASE 7.—*Cone-shaped hemorrhage with the base posterior lying entirely within the thalamus; greatest diameters 30 x 25 x 13 mm. Hemiparesis; no aphasia. Confusion increasing from moderate to marked. Second positive case.* (Fig. 8.)

The patient, a colored woman, was probably 46 years old. While being driven home by her white employer, she began to vomit and became speechless. The blood pressure at different times on the day of entry was 180/130 and 140/94. The blood and spinal fluid Wassermann tests were twice negative, but the spinal fluid Kahn was respectively three plus and four plus. A history of anti-luetic treatment was later obtained.

The right side of the body was at all times definitely weakened. Sensation could not be tested owing to the mental condition. Speech was invariably possible and probably unaffected, but the consistent disinclination to respond made all testing difficult.

Three days after entry the patient was not in shock, but appeared ill in disproportion to the paralysis and she was dull and apathetic. She gave her name and realized that she was in a hospital and in answer to questions stated that she had suffered a stroke while on the way home from work. Answers were monosyllabic and generally were obtained only by leading questions. Simple commands were correctly executed. The nurse stated that she was "off" at times, had to be fed and was "involuntary" at all times. The impression was that she was definitely confused, although it was thought that local shock in the brain might still be present.

Three days later the patient was still more unresponsive. She still realized she was in hospital, but first gave an incorrect name and then could think of no other. She did not appear to recognize the doctors and nurses who had been attending her and said she had not had breakfast or lunch although the time was afternoon. She could answer questions as to her name, pain, hunger and the like and execute simple commands, but failed to answer many questions and some replies were unintelligible mumbles. She was thought to be "considerably confused." Thereafter on several examinations the condition was found to be almost the same, except that the mental confusion steadily became somewhat more marked, until two days before the end when she became generally spastic, tremulous and stuporose. Death 30 days after onset.

Examination of the brain showed a roughly conical clot, lying entirely within the thalamus, that filled the pulvinar and extended diagonally forward in decreasing size to terminate near the anterior extremity of the organ. An area of blood-stained softening 1 cm. x 3 mm., continued a short distance into the capsule. About midway the diagonal portion, 2 cm. x 6 mm., was wedge-shaped and ran through the center of the thalamus from a point at the lower extremity of the ventricle to a base at the upper lateral limit. The size in the pulvinar was 25 x 13 mm. Otherwise the brain was entirely normal and the basal vessels were only slightly sclerosed. Upon microscopic examination no perivascular infiltration of cells was found.

This excellent case is valuable because the attending symptoms were probably mostly due to the actual destruction along with, of course, some slight pressure on nearby structures. The increasing severity of the clinical findings may have been due to a continued oozing of blood, although this point could not be established from the clot itself. The lues was probably not a contributing factor in the mental symptomatology.

If this case is contrasted with Case 3, the importance of the factor of location becomes glaringly apparent.

These cases in which clinical and anatomical findings are correlated provide several important links for the chain of negative and positive evidence. The first two cases taken together strongly indicate, if they do not definitely prove, that the cortex of the area being investigated plays no special rôle in the production of the type of intellectual defect described. Several of Dandy's cases, notably two in which Broca's area was removed,[8] and the one, mentioned above, in which the incision was located forward almost to the post central gyrus, in all of which a great deal of this part of the cortex was excised go far towards supporting the same thesis.

Case 3 continues the process of elimination and clears the anterior portion of the basal structures, namely the caudate (in part) and lenticular nuclei and structures immediately underlying the island of Reil of participation; while Case 4 goes still further by excluding a part of the lateral nucleus of the thalamus and some of the basal cortex of the temporal lobe probably not included in the various surgical ablations.

Thus the process of elimination has so far extended to all structures excepting parts of the optic thalamus and adjacent structures. The two positive cases complete the pictures by exhibiting lesions of these very structures. These two cases are almost ideal in that other factors than the actual destruction appear to be reduced to a minimum, although certainly not absent altogether.

As was pointed out in the case reports, these cases also bring out several other important points. Case 1 serves to correct the erroneous impression given by Dandy's cases of ligation of the anterior cerebral artery that the resulting lesion necessarily causes complete and permanent loss of consciousness. Case 2 both shows some

of the complications to be allowed for in evaluating intelligence clinically and illustrates the retention of good intelligence in the presence of motor aphasia. Case 4 indicates that very good intelligence can be maintained in the presence of jargon aphasia. Case 5 sounds a warning note for clinical and to some extent for pathological studies.

By the negative and positive evidence, therefore, a quite small area lying posteriorly near the base of the brain is definitely implicated as being that responsible, when injured, for "clouding," "confusion" and "dementia." This conclusion is in substantial agreement with that of Marie published 30 years ago. The conclusion, however, is still to a degree tentative because there are too many uncertain factors for a few cases, however suitable, to be decisive.

Summary and Discussion.

To sum up the evidence briefly, (1) the various surgical excisions of Dandy and others and the observations of left vascular hemiplegia serve to exclude from a part in the production of essential intellectual defect all areas of the brain except that under investigation; (2) clinical studies of many cases of right vascular hemiplegia, wherein the lesions are generally in the area being studied, are useful in defining and delimiting the intellectual defect and indicate that this is, at least for the most part, a separate and distinct symptom or group of related symptoms; (3) correlated clnical and pathological studies, among a number of instructive points demonstrated, apparently exclude the cortex of most, if not all, of the area under consideration as a source of intellectual defect and likewise the anterior portion of the base, while two cases directly implicate the posterior portion of the basal structures.

No elucidation of the several findings considered singly and together other than the one of the location of the lesion, has suggested itself during the course of the studies. Such factors as the size of the lesion, the acuteness of its onset, effects at a distance from circulatory or mechanical effects or an unsuspected peculiarity of handedness or combinations of these factors are found not to be sufficient, in view of all the findings and the number of cases observed, to account for the various results. Still it is possible that the most profound and permanent defects are found only in con-

nection with widespread involvement; thus if the functions should grade away from a peak, many lesions might produce no appreciable effect, others partial defects and only extensive lesions the most severe and lasting involvement. Although more cases are required to give assurance in a field so novel as this one still is, the main conclusion appears to be amply justified.

The criterion adopted, that of the preservation of the essential intellectual functions (without regard to the details of memory, learning capacity, scholarship, emotional stability, initiative, etc.) or of the defects of these functions as the psychiatrist knows them has proved to be reliable and satisfactory. For more reasons than one, it is not justifiable to apply to these patients the standards set up for normal people. For one thing physical and circulatory changes within the skull after a severe episode will generally affect the highest performance even though the mental functions are themselves not actually involved. Assuredly qualitative changes are a better index to actual involvement than are quantitative alterations; otherwise most of us could be convicted of having a defect every few days.

No attempt has been made to determine what may be the nature of the functions, injury to which gives rise to the intellectual defects being studied. Obviously the nature of these functions means a great deal towards the understanding of the physiology of mental activity and will have to be investigated in its turn.

The *implications* of the conclusion reached are both broad and important.

One of these is the too great reliance which scientists have placed on the cortex in connection with mental processes and related functions. Dandy and, no doubt, others began to recognize the extent of this error when large excisions of brain tissue did not result in a comparable disturbance of these functions. Now the basal structures, particularly those of the left side, take on added significance and many readjustments in accepted conceptions become necessary. That the remainder of the brain may complement, complete and intensify does not alter the fundamental conclusion.

Another point is that we may have been searching all these years in the wrong spots for the anatomical changes of mental disease, epilepsy and similar disorders; logically the first place to look for such changes is where mental functions are chiefly subserved.

Still another implication, as Dandy mentions, is that the frontal lobe syndrome, so-called, may not be of frontal origin at all, since surgical removal of these lobes has been unaccompanied by the findings to be expected. The "crowbar man" may have suffered from irresponsibility and patients with frontal tumors may exhibit levity, prankishness and excitability not through any actual destruction, but from indirect pressure and circulatory disturbance acting on nearby structures. As the thalamus has been credited with possessing powers over emotional control, this may be the organ concerned; in which case the change of character would be due not to a loss of higher moral or intellectual conceptions, but to the eruption of emotional factors released by a disturbance at their seat.

Conclusions.

Reports of surgical operations in which various parts of both hemispheres were removed and of cases of left hemiplegia lead to the conclusion that intellectual defect *per se* is not produced by lesions other than those of the central portion of the left hemisphere in right-handed persons. A clinical study of cases of right hemiplegia affords a clearer conception of the nature of the intellectual defect produced by focal lesions and indicates that this is an affection or group of related affections more or less separable from defects frequently associated with it, such as aphasia, apraxia, paralysis, sensory loss and emotional disorder. Correlated clinical and pathological studies of seven cases, among a number of corroborative points brought out, serve to localize still more exactly the structures from which intellectual defect is produced by injury, both negative and positive evidence indicating that these occupy a relatively small area situated posteriorly in the basal region of the brain. The implications of this conclusion seem to be extraordinarily far-reaching.

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DISCUSSION.

DR. CHARLES ENGLANDER (Newark, N. J.).—Dr. Alford's paper is interesting from the standpoint of the types of patients and the lesions which he demonstrated, but it scarcely seems fair on the inferential basis to make such wide assumptions as the Doctor does. I was taught to believe that the basal ganglia are subordinate to the cortex. I don't think the Doctor has introduced any evidence here this morning to change that view.

The clinical features which his changes show are not unique. They are the sort that most of us have been seeing in lesions of this sort, and if we were to assume that intelligence was restricted to such a narrow area within the cerebrum, I am afraid that our psychiatric implications and our neurological implications would become tremendously more chaotic than we now see in such features as studies in aphasia and in our studies on intelligence.

I have the feeling that if the Doctor's patients had survived long enough to have been studied from the standpoint of intellectual defects and from their ability to learn new things, perhaps his conclusions would be altered.

I am not satisfied that the lobectomies which the neurosurgeons are doing and the excellent reports which have been coming to us in partial ablations of the frontal lobes are altogether satisfying. It is my impression that what we are learning from these facts are: That the brain can get along without some parts of the frontal lobes or some parts of both frontal lobes, or total lobectomies, and that all we have learned is that the brain still has these tremendous potential abilities for adaptation after large portions of the cortex and white matter have been removed.

To assume that so much of intellectual activity is in the basal ganglia is rather farfetched.

DR. RAYMOND C. FAGLEY (The Bronx, New York).—Dr. Alford in attempting to localize the area of intelligence in the brain states, "The general conclusion is, therefore, that general intellectual defects develop only after injuries of a limited area of the left base."

From the experience of Dandy, and others, it would seem that intelligence is not to be located in the frontal lobe of the brain as has been formerly thought. But many still believe that in the frontal lobe, the final correlation of sensory impressions takes place, and its development is coordinate with the growth of intelligence and culture.

Dr. Alford's study of the brain was "restricted to the middle portion of the left hemisphere, the vascular accident with right hemiplegia; particularly thrombosis and embolism afforded a useful source of material—accordingly material of this nature has constituted the chief source of data." Focal lesions in this area usually result in hemiplegia on the right side, associated in some cases with aphasia.

I do not believe that the localization can be satisfactory in cases of thrombosis and embolism, especially thrombosis, because there can be and usually are other arterial changes present in the brain. It is true that sometimes one has great difficulty in determining the amount of intelligence in the presence of a well-marked aphasia.

The question of defect in intelligence in the various types of aphasias has been a subject of controversy. This must be considered to apply only to local lesions and not to softenings occurring in senile or arteriosclerotic brains. Intelligence, in its broadest sense, is affected, but Head rightfully insists that thought may be going on without symbolization or internal speech. But, obviously, the patient cannot "think to himself." His acts may be correct, but they seem automatic. His difficulty in a world of beings using symbols in every procedure leave him utterly alone, without a chance of social intercourse. His intelligence is one which is portrayed only in his spontaneous actions.

Weisenburg, after a life-long study of aphasia, finally concluded that it is not possible to localize definitely aphasic disturbances. Psychologic studies have shown that speech disorders go far beyond the lingual process. Speech depends upon the unified activity of the whole brain associations.

Grinker states, "It is obvious that such faculties as consciousness, intelligence, memory, speech and life phenomena cannot be localized to any one part of the brain."

Aphasia and defects of intelligence are very closely allied, and if ever we localize the aphasia center we will be close in localizing intelligence, or perhaps the process may be reversed. It has been demonstrated in right-handed people that coherent speech can be reëstablished in lesions of the speech center of the left side of the brain. It is thought that a speech center is established in the right side in these cases. It is possible that in some people, there has been established during growth a speech center in both sides of the brain. This could account for the failure of aphasia to develop in lesions of the left side of the brain, where we ordinarily would expect to find that condition.

Dr. Alford, in his series, studied 50 cases with left-sided hemiplegia, all of whom gave negative results for intellectual involvement. He states, "Excisions of the right hemisphere does not take into account the central nuclei,

the lenticular and caudate nucleus and the thalamus." The 50 cases taken at random from material at an infirmary all gave negative results for intellectual involvement, while 50 control cases of right hemiplegia gave a different result. From this observation, he has eliminated lesions of the entire right half of the brain from cortex to base as the source of mental defect.

I recently examined an Italian, age 48, who came to this country at the age of 14 years. He is right-handed. He shows a hemiplegia on the left side, including a lower facial paralysis, a speech disturbance, and a defect in intelligence. There is no history of lues and serological examination is negative for syphilis. The blood pressure is 214/154.

He had his first stroke while at work in September, 1931, with a slow onset and without losing consciousness. For three or four weeks he had a speech difficulty, and was hard to understand. About one year later, he began to show an irritability, neglected customers, and became somewhat forgetful. If he did not write down a telephone order immediately, he would forget it. He carried on his business until December, 1936, when he had another stroke while asleep. Following this he was unable to talk until March of this year. Since March, he has been having emotional outbursts of weeping. He knew everything that was said to him, but he could not speak. At the present time, he articulates fairly well, but every once in a while the words run together and one cannot understand him. In writing his first name, Joseph, he left off the "h" but as soon as this was called to his attention, he recognized his error. The address with the street number was spelled correctly. He was then asked to write his name in Italian. Again he made a mistake in spelling his first name, Guiseppe, leaving off the last two letters. When called to his attention, he again corrected the spelling.

Although his attention was good and he was not confused, retention and immediate recall memory was faulty. He was given the number 654321, and the address of 130 West Kingsbridge Road, and after being repeated to him several times, he was told that in five minutes he would be asked to repeat. Two minutes later he was unable to recall any numbers but 64, and gave the address as 130 Kingsbridge West. Although 12 days in the hospital, he could not name the nurse or attendants. You certainly cannot say that this man was normal mentally.

Superficially, there may not appear to be any memory or intellectual defect, but on closer examination of the patient, a well-defined defect in the intelligence is obtained. This man had been in business for 25 years, and had made a success up to the time of his first stroke. Although he continued for five years, he lost business and finally closed his store in December, 1936.

The causative factor in this case is undoubtedly a thrombus on the right side of the brain, but with a blood pressure of 214, I do not think we are justified in limiting the lesion to one particular area, only.

In brain tumors, we have pressure symptoms to deal with in addition to the focal signs. Dr. Alford, quoting Dandy, states, "The entire body of the corpus callosum may be split in the midline without any appreciable

disturbance of function. This structure is, therefore, eliminated from participation in the important functions which have hitherto been ascribed to it."

There are many cases reported in the literature which show that involvement of the corpus callosum did show abnormal findings. Trescher and Ford report a case of colloid cyst of the third ventricle which was removed by the posterior approach and the posterior half or more of the corpus callosum was sectioned during the operation. Reasons were given to support their belief that section of the corpus callosum was the only significant injury inflicted on the brain. After the operation, she was completely disoriented for time, place and person, for a period of three weeks. She had an inability to form and retain topographic memories so that she would become lost in her own home. Although there was some improvement in this later condition, yet four years after this operation she still showed loss of sense of direction.

Voris and Adson reported mental findings in 92 per cent of a group of cases with tumors of the corpus callosum. This percentage is even higher than is usually found in frontal brain tumors.

In conclusion, I do not fully understand the extent of the intellectual field that Dr. Alford is trying to cover. Is it the emotional field, the sensorium, mental grasp and capacity upon which findings we ordinarily establish an estimate of the intellectual capacities and resources of the individual? The preponderance of evidence today shows that there is no specific localized area of either aphasia or mental defect, but Dr. Alford has given us an idea that I think warrants further study, especially the importance he has brought out concerning the negative findings.

Dr. William Nelson (St. Louis).—We owe a great deal to Dr. Alford for raising this question, particularly since in more recent years we have become interested in trying to define what constitutes intelligence. In the first place, we cannot think of the functions of the human organism without considering the individual as a total personality representation. We cannot isolate certain aspects of reactions or perceptions and reactions on the part of human beings and consider that we are covering a certain field that would represent intelligence, and, therefore, in any consideration of what constitutes intelligence, we must think of the total representation of that individual.

We are taking most of these cases, for illustration, from rather the decadent period of life, if you will, at least the period of life in which all of us begin to deteriorate somewhat, and there are other correlated conditions that exist in many of them which we cannot extricate from the possible influence upon such a condition. In addition to that, we have an historic past of individuals that we cannot discount and consider the situation only from what we find at the time. Take any one of us and have us deprived of our avenues of perception, or our mechanisms of response, suddenly as a result of some lesion, and you will find all sorts of confusions on the part of the individual—I don't say every individual, but with a great many of them you will find as many confusional reactions on the part of that individual as a result of

being deprived of a mechanism of response that has been familiar to him and has been cultured and developed over a period of years.

Those are things that come into consideration in estimating the intelligence of these people. When we come to a consideration of this, then I dare say we are not justified in concluding that over a relatively temporary period following the incidence of these lesions that an individual reaction, confused or deprived state, that we are justified in concluding that that is the intelligence.

I want to comment somewhat on Dr. Englander's remarks: I think he is right to conclude that we do not have a narrowed area of representation that embraces the broad function of intelligence. Intelligence is a very complicated and complex matter, and no doubt the basal ganglia, the peripheral nerves, the spinal cord—all of the tissues and organs of the body participate in what we recognize today as intelligence.

Most of us are familiar with the work that Shepherd Alvery Franz did several years ago up to the time of his ultimely death, in reëducating individuals that had lesions such as Dr. Alford has described or illustrated for us, and he found that there was a restoration of function commensurate with the reactions of the individuals that he had under study and under reëducation, so that the question of intelligence is a broad one that we cannot draw analysis from or react inferentially toward and I do not think that we have our intelligence represented in such a narrow phase of cerebral organ or cerebral tissue that deletion of a certain aspect of it is going to represent the loss of function on the part of that individual.

Let us think of the ambidextrous people, or the people who have to change from righthandedness to lefthandedness. What happens? We have some people who have been righthanded all their life, whether normally or not, and through some reason or other they change to lefthandedness, or we have the individual who is ambidextrous; how is their intelligence going to be represented?

Those are some questions that I would like to bring up for consideration.

Dr. Leland B. Alford (St. Louis, Mo.).—I realize how revolutionary these views are, and I probably shouldn't have had the nerve to bring them up if the surgeons hadn't been expressing similar views for a number of years. So there has been a tendency in this direction for some time. I didn't bring out part of the paper. I have observed clinical cases over seven or eight years, and, therefore, these few anatomical cases are backed up by a great many clinical cases. There hasn't been anything inconsistent, however, in the clinical cases. Occasionally one does find a left hemipleiga with involved mentality, and I have had autopsies on those cases. In one autopsy the lesions were bilateral, and in Dr. Fagley's case, the fact that speech was affected would indicate that it was a lefthanded man.

As to the time element, I know that should come in; it should come in in proportion to the severity of the lesions; the last case was 30 days, with a small hemorrhage. That should eliminate the shock element.

As to the findings of some of the men in section of the corpus callosum, I want to aagin emphasize the force of the negative finding over the positive finding. There are so many secondary factors that come in. There are pages that tell about the mental changes in connection with lesions of the right hemisphere. However, I think one negative case or two negative cases would overrule all of those, merely because of the possibility of secondary factors, circulatory changes, pressure, and that sort of thing. I chose what most psychiatrists call intellectual involvement, that is, clouding or confusion. It is a pretty definite term. It doesn't include emotional disturbance.

I don't think it is right to include total performance. A man with a big hole in his head near such vital centers shouldn't be expected to carry on mentally as a normal person would do.

As to the ambidextrous, I have a patient now who is ambidextrous, with a right hemiplegia, very mild, and he shows mental confusion, just the same as the patients who claim they are righthanded. Whether that would hold out in all cases, I don't know.

In conclusion, I think the evidence is all too consistent, the negative evidence in certain cases and the positive evidence in others, to be ignored.

SODIUM AMYTAL AS A SUBSTITUTE FOR TUBE FEEDING.*

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In every psychiatric institution, there are always patients who are problems in that they persistently refuse nourishment, either liquid or solid. These cases present the dilemma that, on the one hand, rejection of food tends to prevent or delay recovery, and, on the other, tube feeding has disadvantages and dangers. Feeding is relatively simple in cooperative patients, but in active, resistive patients it gives rise to many complications. The patient may hinder the passage of the tube to such an extent that trauma with subsequent infection of the nasal, pharyngeal passages may develop. Even though the tube is properly passed and the feeding in progress, the patient may vomit the tube or the gastric contents and aspirate some of the tube feeding, thereby developing an aspiration pneumonia or a lung abscess. Moreover, to supply adequate nourishment in calories, vitamins, minerals and bulk by tube feeding is difficult and inexpedient. Patients tube fed over a long period usually lack some essential requirements of a well-balanced diet and suffer from this deficiency as a consequence. Often a severe diarrhea results which can be controlled only by the discontinuance of the tube feeding.

In certain cases admitted to the psychiatric wards of the Charles V. Chapin Hospital, we had this problem to contend with. It was recently observed that sodium amytal given either intravenously or intramuscularly eliminated the necessity of tube feeding as patients invariably took nourishment after the administration of this drug.

We had the opportunity to experiment successfully with ten patients: five were cases of schizophrenia, and two of post-partum psychosis with a schizophrenic background; one had pulmonary

* Read at the meeting of the Rhode Island Society of Neurology and Psychiatry, April 12, 1937.

tuberculosis with a toxic psychosis following a first stage thoracoplasty; one was diagnosed psychosis with cerebral arteriosclerosis; and another, an extremely active and resistive patient, was treated for general paresis.

In two cases the drug did not react as we had expected, but a fair trial was not given as one patient began eating and the other was discharged against advice. The first was an active, negativistic patient who was under treatment for involutional melancholia complicated by diabetes. She became more excited after small doses of the drug and in larger doses went to sleep. The second patient, a cerebral arteriosclerotic and hypertension complicated by auricular fibrillation, was also active and negativistic and became excited with the drug. These two cases were not studied sufficiently to ascertain the correct dosage of sodium amytal as a substitute for gavage, before one suddenly became better and the other went home against advice.

In the group of cases with whom the drug was effective, the ideal reaction was observed in the depressed catatonic reaction rather than in the active manic state, regardless of the type of psychosis with which we were dealing. However, in the case of the paretic who refused all nourishment and medication by mouth, the sodium amytal was most helpful as all other parenteral sedatives were without effect, unless given in very large doses and then over a period sufficient for cumulative toxic effects. Under small doses of sodium amytal he was fed and given paraldehyde which was continued thereafter without sodium amytal. Paraldehyde was the sedative of choice to carry him through his active psychomotor state to prevent death from exhaustion or injury. It was also interesting to notice certain patients in this group who had previously refused all food and had been absolutely mute, suddenly eat and talk. Most of them could not explain why they had refused food and suffered the discomfort of a tube feeding and then, under sodium amytal, asked for food.

We observed that the same effect could be obtained whether the drug was given intravenously or intramuscularly. When given intravenously, however, the patient took solids or liquids immediately after the needle was withdrawn from the vein and the desire to eat and also talk usually lasted from 10 to 15 minutes.

When injected intramuscularly, the patient began to take nourishment 15 to 30 minutes afterward and the effects lasted 15 to 30 minutes. Sometimes a patient took fluids one and a half hours after the intramuscular injection. It was noticed, too, that solid foods, unless especially well-liked, were not taken as well as fluids when the drug was given intramuscularly and even then had to be more or less forced.

The optimum dose for the required action has not been satisfactorily decided. This varies, however, with the type of patient, the weight, age, activity or depression—all are factors to be taken into consideration. Our doses varied from $3\frac{3}{4}$ grains to $7\frac{1}{2}$ grains when given either intravenously or intramuscularly. The desired dose causes a semiconscious state and is determined only after one or two trials. If the dose is too small, the desired reaction does not follow. On the other hand, if it is too large the patient will fall into a deep sleep. It is unwise to force fluids or solids on patients who have had an overdose of the drug for in such cases there is a certain amount of paresis of the muscles of deglutition and forcing nourishment too quickly before the patient can swallow may cause some of the food to enter the trachea and bronchi. To illustrate this—one of our cases, a man who was being X-rayed for a G. I. series, refused to drink the barium preparation. He was then given sodium amytal intravenously and willingly began to drink the solution. He was forced to drink the barium too quickly and, as a result, started to cough and became slightly cyanotic. He was fluoroscoped immediately and the barium was seen in the trachea and bronchi and also in the stomach. This would not have happened if the barium had not been forced more quickly than the patient could drink it. One patient in our series ate after only one intravenous injection, others after a few days. One patient was given sodium amytal for weeks, but she was later transferred to the State Mental Hospital and could not be followed. There was no evidence of toxic symptoms in these cases.

Whether or not these same ten cases might have progressed more favorably and eaten sooner following tube feeding is doubtful. However, under sodium amytal all ate, talked, gained weight, received a well-balanced diet and developed no diarrhea. They were less resistive and negativistic, and also indirectly obtained needed rest and sleep following the administration of the drug.

PRIMARY AFFECT HUNGER.*

By DAVID M. LEVY, M. D., New York, N. Y.

In a previous study of maternal overprotection, an investigation was made of a mother-child relationship featured by an excess of maternal love. This excess was demonstrated overtly in maternal behavior through physical and social contact with the child, infantilization, extra precautions and protective behavior. Definite criteria of a relationship were set up, and cases selected, out of a large number, in which the criteria were satisfied. Case studies were thereby utilized in the form of an experiment, as though to say: If we could make an experimental study of such a relationship, we would have to satisfy certain conditions. Let us see if in a large body of case material such conditions are already satisfied. Naturally, the more definite and numerous the criteria the fewer the number of cases that can be filtered out by this process. The advantage, however, is that the greater the selectivity, the "purer" the relationship to be studied.

During the study of maternal overprotection, it was necessary to select, for the purpose of contrast studies, cases of maternal rejection. In the latter group, however, selective criteria were never adequately worked out. Since the investigation of the overprotective groups was terminated by the closing of the Institute for Child Guidance, a staff was no longer available for study of the numerous details that were part of the undertaking. In the absence of such aids to a companion study of maternal rejection, it is necessary to have recourse to a simpler method. I must therefore, in this paper, utilize illustrative cases to indicate certain basic dynamic principles, without statistical aids. Furthermore, this study is limited in its orientation to the child who suffers the rejection. It is also limited to the experience of a certain type of rejection, to which I am applying the name "affect hunger."

The term, affect hunger, is used to mean an emotional hunger for maternal love and those other feelings of protection and care

* This and the following five papers, constituting a symposium on child psychiatry, were read at the ninety-third annual meeting of the American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

implied in the mother-child relationship. The term has been utilized to indicate a state of privation due primarily to a lack of maternal affection, with a resulting need, as of food in a state of starvation. Since the symptoms of affect hunger are clearly manifested in children who receive maternal care and direction to a high degree in a physical and intellectual sense, though without any evidence of affection, the analogy is more accurately related to a vitamin deficiency rather than to a gross starvation. The use of the term affect hunger, rather than affection or love hunger, opens the possibility, also, of a privation of other sources of the emotional life, even possibly of hostility, though this is yet to be investigated. A child who has been overprotected and later, through the birth of another child, thrown into a rejected state, may also suffer affect hunger. In the present paper, however, I am using the term to apply only to individuals who have suffered lack of maternal love in the early years of life. Assuming for the moment the value of maternal love as an essential component in the development of the emotional life, what happens when this element is left out of the primary social relationship? Is it possible that there results a deficiency disease of the emotional life, comparable to a deficiency of vital nutritional elements within the developing organism?

My first example is an eight-year-old girl who was adopted a year and a half before referral. After a illegitimate birth, the child was shifted about from one relative to another, finally brought to a child placing agency, and then placed in a foster home for two months before she came to the referring foster parents. The complaints were lying and stealing. The parents described the child's reaction to the adoption as very casual. When they brought her home and showed her the room she was to have all for herself, and took her on a tour of the house and grounds, she showed apparently no emotional response. Yet she appeared very vivacious and "affectionate on the surface." After a few weeks of experience with her, the mother complained to the husband that the child did not seem able to show any affection. The child, to use the mother's words, "would kiss you but it would mean nothing." The husband told his wife that she was expecting too much, that she should give the child a chance to get adapted to the situation. The mother was somewhat mollified by these remarks, but still insisted that something was wrong. The father said he saw nothing wrong with the child. In a few months, however, he made the same complaint. By this time, also, it was noted that the child was deceitful and evasive. All methods of correction were of no avail. A psychoanalyst was seen. He recommended that the parents stop all correction and give the child a great deal of affection. This method was tried, according to both parents, with no result. The school teacher complained of her general

inattention, and her lack of pride in the way her things looked. However, she did well in her school subjects, in keeping with her good intelligence. She also made friends with children, though none of these were close friendships. After a contact of a year and a half with the patient the father said, "You just can't get to her," and the mother remarked, "I have no more idea today what's going on in that child's mind than I knew the day she came. You can't get under her skin. She never tells what she's thinking or what she feels. She chatters but it's all surface."

I have selected this case as my first illustration of a type of difficulty that is familiar to everyone who works with children, because I feel reasonably sure that the parents were distinctly affectionate with children, and also because their own child, aged twelve, was affectionate and well adjusted.

Repeated experience in the treatment of the type of child referred, indicates a poor prognosis. Before considering this phase of the problem, I would like to cite further examples.

An unmarried woman, aged forty, adopted a child aged two years and eight months, through private arrangement. The child was the illegitimate son of a woman of high economic and social status. The family history was negative. The child was turned over to an agency very soon after birth, placed in an orphanage from age 12 to 27 months and then transferred to a boarding home, where he remained until the period of adoption. After a year, the mother gave up the possibility of getting any emotional relationship with the child. She had never been able to get any sign of affection from him. He never accepted her fondling. In the household there was a doting and indulgent grandmother, to whom the child also did not respond. The mother felt she had been taking punishment for a year and could stand it no longer. Besides the lack of emotional response, she complained chiefly of his negativistic behavior. According to tests the child had superior intelligence, and the physical examination was negative.

The third example is that of a boy adopted at the age of three. The previous history was unknown, except that he was illegitimate and had been shifted around from place to place. A Wassermann test and physical examination made at the time were negative. I examined him at the age of eight years. There was a good health history, and the physical examination was negative. According to tests, the intelligence was adequate. He was referred because he had been twice suspended from school for poor work, and the fact that he made a general nuisance of himself. The mother had given up hope of making any relationship with him. He showed no affectionate response. Altough she made several trips away from home, he never asked about her when she was away. Punishment or ordinary methods of correction had no effect. He would "forget" too easily. His behavior in the office was quite infantile, I thought like that of a three year old boy. He showed a

complete lack of appreciation of his difficulties at school and at home. There was no question of some distinct emotional deficiency in his response.

The fourth case is another example of an adopted child, a girl aged nine years and ten months at the time of referral to the Institute for Child Guidance. She was referred for general incorrigibility. She was adopted at the age of seven months into a home in which the foster mother could give little affection, but demanded highly conventional behavior. Before the referral, she had been seen by two psychiatrists, one in consultation and the other for a series of about twelve interviews. She had also received thyroid treatment for a period of time, though our findings showed no evidence of physical difficulty. Our examination revealed, besides the problems for which she was referred, fantastic lying, difficulty in making any friendly relationships with children, and school retardation. The parents noted especially her "failure to profit by experience" and "unresponsiveness to affection." The problem was complicated by the fact that the home was of superior type in a cultural sense—requirements that were too high for a child with an I. Q. of 80. The entire history led to the conclusion that the patient had some inadequacy in her emotional response and was an unfavorable subject for therapy. The parents were, throughout the long contact that ensued, conscientious in cooperating with every therapeutic effort. The patient was treated by the psychiatrist, utilizing chiefly a psychoanalytic method, for a period of two years. The behavior of the patient during the process of over 200 sessions was markedly negativistic. There were some interesting periods of improvement. Nevertheless, the result of the entire therapy was practically nil. At the end of the treatment, the parents were willing to consider another therapeutic adventure before referring the child to foster care. Through special circumstances, it was possible to send the child to Vienna, where she was treated by a psychiatrist of the Adlerian school, with whom she lived for a period of three years. The results were essentially negative; indeed, the child's problems became more alarming because of her greatly increased aggression. She was thereupon sent to her own mother and very quickly got into difficulty because of her incorrigibility and because, somehow or other, she had managed to collect five revolvers. From there she was sent to an orphanage, from which she ran away on two occasions, and then to a detention home, from which the psychiatrist wrote that he considered the patient an excellent prospect for intensive psychotherapy. At the last notation patient was eighteen. It is interesting that the typical attitude of the psychiatrist was that she would respond to psychotherapy. I have cited this case especially to show the failure of psychotherapy to meet these problems.

These case illustrations are given as examples of emotional pathology caused by primary affect hunger of a severe degree. The symptom-complaints are of various types. They include, frequently, aggressive sexual behavior in early life, stealing, lying, often of the fantastic type, and, essentially, complaints, variously expressed, that

indicate some lack of emotional response in the child. It is this lack of emotional response, this shallowness of affect, that explains the difficulty in modifying behavior. The inhibitions to the instinctive impulses, normally strengthened by the response to maternal affection, are no longer in operation. As an instrument in modifying behavior, the power of maternal love may be seen most clearly in life histories where it is absent—a kind of ablation experiment in social life. That the difficulty in these cases is due to a primary affect hunger seems a reasonable assumption, even though not proven by any direct experiment or by statistical checks. Does it follow, necessarily, that any child who suffers complete loss of maternal love, during the infantile period, will develop into a psychopathic personality of the type described? Further, in a number of cases in which a child was given presumably normal maternal love, in the first two years of life, the same difficulties may occur when an attempt at adoption is made at this age. Such cases were sufficiently numerous in my experience to warrant the advice that adoptions be made either in the first year of life, or after the infantile period. It was assumed that when the early emotional attachments were made by the child, as the personality began to grow, a break at this stage caused a situation similar to one in which the child could make no emotional attachment to start with.

There is an interesting bit of evidence on the prognosis in cases of primary affect hunger in a recent issue of the American Journal of Orthopsychiatry.[1] Eighty-one delinquent girls were treated by a combination of social and psychotherapy. Successes and failures were tabulated by follow-up studies varying from one to five years, after discharge from the home. One of the investigators independently analyzed the parent-child relationships and classified them into four groups. The successes and failures were then checked against these classifications. They illustrate a finding already determined in previous studies, to wit that the cooperation of the parent is the most important item in prognosis. One finding, however, is especially striking, namely, that the 17 cases in which there was evidence of complete rejection, showed 100 per cent fail-

[1] F. Powdermaker, H. Turner Levis, and G. Touraine: Psychopathology and Treatment of Delinquent Girls. Am. Jr. Orthopsychiatry, 7: 58 (Jan.) 1937.

ure in response to therapy. This is in contrast with the general result of 50 per cent success for the group. The case examples of complete rejection cited are extreme and convincing.

In contrast with the extreme cases of affect hunger we have, at the other end of the scale, a series of children whose difficulties are solved by the restoration of maternal love. In such cases psychotherapy may be either unnecessary or merely a complementary therapy. There are a number of children who do well with affectionate foster parents, or with a psychiatrist who renders the therapeutic relationship primarily supportive. This type of treatment, to which the name supportive therapy has been given, is a recognition of the fact that in certain cases the child's hunger for love must be gratified. It is recognized that in every therapeutic relationship the patient receives some support of this type (transference) but there are cases in which the treatment must be primarily, even exclusively, supportive; a treatment in which the worker acts *in loco parentis*. Favorable results with such children are often utilized to prove the particular merits of this or the other type of psychotherapy, whereas it matters little what technique is used as long as the child feels loved.

A patient was referred to the Institute for Child Guidance at the age of nine years, with a complaint of enuresis and temper tantrums. A visitor to the foster home wrote a letter to the Institute from which the following excerpt is taken: "He is starved for affection. His mother rarely visits him, although she is urged to do so frequently. When she is there, he acts very infantile, climbing up on her lap, always wishing to be with her, and showing off. Then as time elapses after her visit, he becomes more unmanageable and disagreeable." The history of the case is featured by the child's affectionate response to grown-ups, his making up to any stranger, the explosive and dangerous temper tantrums, and marked jealousy of the other children in the foster home. The "hunger" element in the difficulty is seen in the response to grownups and to the mother, with whom he acts in complete disregard of what is usually a strong inhibiting influence—the presence of other boys. When his mother is about he is always sitting in her lap, he holds his face up to be kissed and puts his arms around her neck. According to the foster mother, he acts in these situations quite like an infant. Though affectionate to the foster mother, he makes no such display with her. The severity of the temper tantrums must be mentioned. On one occasion he tried to break up a game which the other boys were playing. The foster mother sent him to his room, whereupon he tore up the bedding and pulled all the pictures off the walls. On another occasion he attempted to hit a boy with an axe. On another, he chased the teacher and the children out of school.

The patient lived with his father and mother in the first year of life. After the death of the father he was placed in an institution for a year, then for two years in a boarding home, from which he was removed by his mother. He was placed again with the previous boarding mother. He was moved again to a foster home in which he had been living for a year and four months at the time of referral. There are certain elements in the history that indicate a certain modicum of affection from the mother and in the homes in which he was placed. In one boarding home there was an affectionate mother. The foster mother also was affectionate with him. Furthermore, his own mother, though very spasmodic and infrequent in her visits, was affectionate while with him.

In this case, treatment consisted in getting placement with a foster mother who could give him a great deal of affection. There were only four interviews with the psychiatrist. They consisted largely of chats about the foster home. Marked improvement in behavior occurred and continued for two years. A follow-up study made when the patient was twelve years six months old, showed complete cessation of the temper tantrums, good school adjustment, growth in responsibility, though no improvement in the enuresis.

The case described illustrates a very frequent problem for social agencies. A number of cases in the Institute for Child Guidance series show a growing adjustment under the care of an affectionate foster mother. Such therapeutic benefit may occur even in the adolescent group. However, the stumbling block is often the mother of the child, who continues sporadic contact. She visits the child once a week, more commonly once in several weeks, and thereby prevents the building up of a stable relationship with the foster parent. Furthermore, the fact that the child is under foster care while his own mother is still in contact with him, stimulates various fantasies of abandonment, confusion about his own place in the world, sometimes even a confusion of self-identity, often an illusion that the mother who has really abandoned him is a loving and protecting mother. Agencies seem to foster this illusion on the part of the child, because otherwise they would feel guilty of encouraging hostile feelings toward the mother. The mother who has given the child to foster care, yet refuses to give up the child for adoption, is motivated by her feelings of guilt over the rejection and thereby acts as a great handicap to the child's stability. Frequently, also, we have instances in which the mother removes the child from one boarding home, has the child live with her for a week, and then through the agency gets another placement. Because of her own guilt, also, she may find all kinds of fault with different foster

mothers. It is not unexpected, therefore, that a recent follow-up in the case of this patient, now age 18, shows this type of history: discharged from a foster mother to his own mother, back to another foster mother, truancies to his own mother, then placement in a farm school.

In a similar case, presented by Dr. Blanchard at the last meeting of the American Orthopsychiatric Association, the main psychodynamics are clearly discernible. (1) A group of activities representing responses to the primary need. They are manifested in various manoeuvers to hold closely to a person, to win demonstrations of affection, to plead for love, to utilize pathetic appeals and states of helplessness, in order to stimulate a love response from a mother-person. The kissing-bug reaction represents an avidity for physical affection, as illustrated in the previous case, and belongs in this category of responses. So also a number of the whiners and pleaders and naggers for attention, for closeness and for guarantees that the maternal sustenance will never be withdrawn. Out of this group, also, are derived the mechanisms of constant begging for gifts, also of making overwhelming demands from a friendship later in life, to insure against any possible break in the relationship. (2) A group of activities that represent various hostile acts designed to punish the one who denies love and to prevent the possibility of its withdrawal. The mother who has denied or withheld stimulates a hostile rejoinder in the form of wishes for her death, various sadistic fantasies, even threats to her life, also threats of suicide if she will not respond. The conscious level of these performances varies, but they may be overtly expressed. The temper tantrums, possibly also the enuresis may be manifestations in this group, as may all types of "bad" behavior. (3) A group of symptoms that are based on the child's fear of the hostile impulses. These represent the source of the emotional conflicts and neurotic derivatives of the original state of privation. Fear of death is a manifestation. In fact, for every hostile move there is a retaliatory fear. There are a number of interesting derivatives from this state that have to do with the feeling of being deprived, and its consequences. These have to do with various forms of self-pity, the creation in the individual of helpless states, and even depression, but time does not allow these elaborations.

So far I have cited two types of response to affect hunger, one, the extreme instance in which the emotional development of the child has been adversely affected from the start, with a resulting pathology of affect; the other, an instance in which the renewal of maternal love has a successful restorative function. There now remains a large mid-group of cases in which the problems derivative of the early affect hunger are marked by special and usually persistent relationship difficulties. They follow along the lines in which the denials of maternal love and affection are especially marked.

In the last case cited, a boy who made up to every adult, we have an example of what may become a characteristic of every relationship. Such examples are better seen in those adults, whose social life represents a series of relationships with older people, every one of whom is a substitute mother. They may be single or in combination, the point being simply that the patient must, throughout life, be in contact with a person from whom the same demands are made that were thwarted in the original experience with the mother. The life pattern then becomes dependent on maintaining such relationships. When one of them is broken there is a period of depression, or a feeling that " something is terrifically lacking," until another relationship is made. Another type of reaction is seen in the form chiefly of excessive demands made on the person who is selected to satisfy the privations of early life. Such examples also represent a distinctive cluster of cases seen in social agencies, especially in children who have difficulty in adapting to the foster home. The story in typically that the child makes a good impression, the foster parents are delighted, and then, within a week or two, the demands of the child become so excessive that the foster parents are worn out and insist on release from their charge. The problem is always the same—excessive demands for food, for money, for privileges. Attempts to satisfy them end always in disaster. They represent, it seems to me, the child's need of proof that the adult is a loving parent because he satisfies every requirement that is made, also a hostile motive to destroy by getting things out of them. It is as though the child has to repeat the original frustration. A recent example comes to me of a delinquent boy who, in relation with the social worker, tried to get money from her. It was put on the basis that " if you love me you will do this

for me." If the demand was not satisfied, the refrain would be "then this shows that you don't care for me." Every attempt made at giving insight into the relationship failed. The patient showed initiative in getting a job but quit in a short time because he thought he deserved more money, they should give him more time for lunch, etc., etc. Other jobs were terminated for the same reasons. The patient was able to respond only to stern necessity. He was never modified by therapeutic methods.

No doubt there are a number of children who feel a distinct lack that is related to an original privation, who, nevertheless, are in a state of externally good adjustment. Such children naturally are not referred for treatment, since it is rare that a child is not brought to treatment through an adult. There are, certainly, numerous examples of adults, well adjusted according to the criteria of overt behavior, with complaints of various dissatisfactions, chiefly in the form of futility, or depression, that have their origin primarily in affect hunger. How much of the difficulty is related to a true deficiency in the infantile period, and how much is due to neurotic mechanisms is a question that the psychoanalyst is in the best position to solve, but I feel sure that there are numerous instances in which the deficiency is covered by neurosis, and the difficulty mistakenly attributed to the overlying structure. At least, a recognition of this fact will compel a reorientation to the life history.

The responses described seem to pick out special elements of privation in the mother-child relationship. In the social relationship the protective phase of maternal care may be sought; or the giving function in maternal care may be the special point of attack. In others, it may be the mere demonstration of affection, including also genital satisfaction. These elements represent special incompleteness in the early emotional development of the patient and must be demonstrable in numerous phases of the life history, of which this account can only be a rough sketch.

I have tried in this study to indicate certain basic responses to affect hunger, showing a group of cases in which there are pathologic residues due to an extreme deficiency; second, a group in which the restoration of maternal love has marked therapeutic effect; and third, a group which demonstrates specialized difficulties in social relationships that are derivatives of a primary affect hunger.

CHILD ANALYSIS AS A TECHNIQUE IN THE INVESTIGATION OF MENTAL MECHANISMS.

Illustrated by a Study of Enuresis *

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Child psychiatry encounters several symptoms which, though very common, have no real consensus of opinion as to cause or treatment. Enuresis is one with which the psychiatrist is constantly confronted, yet as evidenced by the voluminous literature on the subject, our knowledge of enuresis seems in inverse relation to the frequency of its occurrence. Many writers agree that psychological causes play an important rôle, but with a few exceptions offer no real evidence upon which to base their opinion, rather only guesses and generalizations. The literature † shows almost as many causes suggested as articles written. Organic etiology divides into somatic and neurological. Among the neurological causes are suggested: spina bifida;[1] defective cerebral control of the bladder reflex[2] or its disturbance by faulty deep sensation;[3] and, if properly subsumed under this heading, inadequate conditioned reflex development.[4] Suggested somatic causes include: thickened bladder musculature,[5, 6] which prevents adequate distention and, like enuresis, is more common in males than in females; and spasmophilia,[7] associated with increased galvanic response. An equal variety of etiological factors is offered in the psychological realm, including: poor training;[8] a wish for attention, associated with the fear of inadequacy;[9] and a failure to develop responsibility.[10] The psychoanalytic literature considers enuresis as a masturbatory equivalent;[11] or as the consequence of conflict between passive and active wishes;[12] an identification of the male with the female;[13] sexual trauma;[14] or as a desire to return to the suckling stage.[15]

Treatment methods are also manifold, based on the assumed etiology. A drastic suggestion[17] is the use of an occlusive bandage

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† No attempt has been made here to review all the literature, which is very repetitious, but some articles are chosen which express the trends clearly.

of adhesive over the genitals to prevent the passage of urine and awaken the child when micturition begins. Of drugs, the most popular is atropine, usually aided by afternoon restriction of fluids and by rectal massage of the bladder.[2] Sunlight and vitamins constitute treatment for enuresis based upon spasmophilia.[7] Frequent awakening of the child to urinate is urged [8] as a means of establishing adequate conditioned reflexes. Various forms of psychotherapy are also offered, such as teaching the child responsibility,[10] and developing self-confidence,[9] and, finally, psychoanalysis.[16]

It is obvious from this review of the literature that there is no agreement yet, either as to the causes or treatment of enuresis-evidence of a serious lack of any real knowledge. In psychiatry and medicine, as in other scientific disciplines, manifold theories betoken lack of satisfactory facts—witness the numerous suggested causes for arthritis and the one known cause of diphtheria.

The solution of such a problem, at least from the psychological angle, obviously requires more facts which can only be obtained by delving deeply into the psychological processes of the individual. Only after the underlying causes and mechanisms have been clearly exposed, may it be possible to correlate them with the manifest symptoms and behavior which they engender. Such a psychic dissection can be achieved with the aid of child analysis. During psychoanalysis, the patient reveals himself far more completely than in other situations. I do not base this statement merely upon a theoretical preconception but upon by own and others' experiences, after using the technique for years.

For many people, "child analysis" unfortunately has become synonymous with the so-called play technique, developed in recent years by several child psychiatrists. To be sure, play is used in analysis as one means of expression, particularly for the younger child. It is generally agreed that play is a means by which the child lives out certain emotional reactions denied him in everyday life, and by which he expresses such concepts of life as he has developed. Since, however, this expression tends to be highly symbolic, it is most valuable not as an end in itself as it is in the play technique of many workers, but rather when it serves as a starting point leading to a verbal expression by the child of its otherwise symbolically acted thoughts and feelings. Since work with the child is carried out in verbal terms, the talking out, rather than the acting out of

attitudes becomes an aim of the analyst. Willingness to talk freely is achieved during the so-called introductory period, which may vary in duration from a week to a month, depending upon the strength of the child's defenses. During this time, because of the analyst's non-critical and accepting attitude, the patient learns that the analyst may be trusted to understand rather than to punish, and that what is done or said during the hour remains confidential. Boldness is thus gained to express thoughts and feelings which were previously carefully guarded from adults. Older children, in the latter part of the latency period, may even willingly lie on the couch while they talk, so that their analysis approximates that of an adult by the free association technique. Younger children, on the other hand, are more apt to talk along with their play or work, speaking of real events and the associated feelings and fantasies, telling stories about pictures drawn, enlarging on fantasies concerning the play entered into, and the like. Interpretation is only given after the material, through its sequential development, is clear and frank, and when the intensity of affect has been decreased by adequate expression in words or actions.

As in adult analysis, the patient's cooperation is greatly increased by illness insight and the wish to be cured but, in contrast to the adult, this is rarely present at the beginning of the analysis of a child. It may usually be secured early, however, by making evident to the child the consequences undesirable to him, of the offending symptom or behavior, and at the same time convincing him of the analyst's desire to help him overcome the source of trouble. The desire for aid in avoiding future pain then leads to talking of subjects which are even able to cause present pain. I shall not discuss further the more detailed technique of child analysis, which is adequately expounded in the literature,[19, 20, 21] but wish mainly to emphasize that, with increasing confidence and during a sufficient time, the child exposes his thoughts and feelings so intimately and in such great detail that one has free access to the essential information concerning the fundamental conflicts and their causes, and to the defense mechanisms developed in an attempt to solve them and which have crystallized into the undesirable reaction formation. Analysis thus becomes the method of choice for studying such symptoms. We need facts on which to base conclusions, and the voluntary self revelation of the patient during an analysis offers

factual material of a richness and surety not otherwise to be secured in the psychic realm.

I have a series of analysed cases of nocturnal enuresis, unfortunately limited to six, but of interest in that certain emotional mechanisms occur in each of them in a characteristic pattern, which is different from the patterns found in children presenting other difficulties. Although only six cases have been completely analyzed, the manifest attitude shown by them has been found equally clearly in 16 others less completely studied. Of the analyzed cases, 3 were boys and 3 were girls; of the others, 10 were boys and 6 girls. Only those patients were selected for study who had developed enuresis after the fifth year and not following the birth of a sibling, thus eliminating children whose enuresis might be based upon slovenly training methods, organic defects or a temporary sibling jealousy. The series was limited, therefore, to cases where the enuresis seemed unequivocally a neurotic symptom.

In all cases, the manifest attitude was quite consistent for boys and for girls but, particularly significant, it differed strikingly in the two sexes. This fact constitutes additional evidence for the psychic causation of this form of neurotic enuresis. The boys' attitude was retiring and self-depreciatory, and fear of physical pain in most of the cases inhibited any form of rough play. They were slow and dawdling in such activities as dressing, eating and getting off to school, and demanded more than the average amount of help and attention in the performance of tasks. None of these boys were doing as well in school as their mental abilities warranted, and there were frequent complaints from teachers that they were inattentive and easily distractible. In ten cases, exhibitionistic reactions were reported, also grimacing, giggling and other non-aggressive ways of attracting the attention of their fellows. There was also a tendency toward evasive petty lying. To this general pattern, there was but one minor exception. One boy, very small for his age, would respond to teasing about his size from older boys by aggressive attacks made in a temper. In all other respects his behavior conformed to the type.

The girls presented an interesting contrast to this picture, appearing much more normal in their manifest attitudes. All were active children, leaders among other girls, independent and proficient in performing tasks. They were successful in school, well

behaved, attentive and ambitious for achievement. Play indulged in with boys showed a strongly competitive spirit, associated with a depreciation of males in general, often verbally expressed. And, finally, they were generally honest and frank in their relations with other individuals. Although the girls, in contrast to the boys, were fearless in daytime activities, both sexes shared a common anxiety, that of nocturnal fears. In some cases, this was evidenced in an undifferentiated fear of the dark without fantasy association. In others, the fear was of attack from some fantasied person, either living or ghostly. Twelve of the children had definite night terrors which awakened them and led them to seek solace from one or both parents. In seven of the cases, these terrors were associated with a remembered recurrent dream, the others were aware of having dreamt but had no memory of the dream content.

In summary, the boys on the whole behaved as if they were inferior to their fellows, whereas the girls behaved as if they were equal or superior to theirs, but in both sexes, a real anxiety expressed itself in nocturnal fear.

In the specific discussion of the analyzed cases, it is obviously impossible to condense into these few minutes the results of several hundred hours study of these children. I shall, therefore, try to document my conclusions with illustrative material from one case of each sex. You will have to accept my scientific good faith that there is adequate evidence for such points as I have to assert rather dogmatically. Each of three boys disclosed during analysis a preponderance of material indicating fear of women as dangerous persons who could injure or destroy him if he were active. The mechanism for overcoming this fear was an identification with the passive woman, and a negation and avoidance of the active rôle of the male. Enuresis thus became part of the passive pattern, urine being allowed to flow uncontrolled and without responsibility for the act. Each girl, on the other hand, presented an excessive amount of material related to the fear of man as a destructive aggressor who could injure her in his activities. She, in turn, avoided the difficulty by denying men their abilities, eliminating them from her existence in fantasy, and yet identifying with the active male instead of the passive female. Enuresis in the girls represented an active soiling rather than a passive flow. Significant, also, is the fact that contrary to the usual findings, no one of these six re-

membered actual masturbation, which leads me to suggest tentatively that enuresis may represent a substitute for masturbation, although further evidence is obviously necessary for such a conclusion. The usual routine material appeared in the course of these analyses, as in all others, these being differentiated by the accent upon one particular developmental conflict and upon the mechanisms used in attempted solution.

I shall briefly describe the relevant material obtained from a 9-year-old boy, material which, in meaningful content though of course not in detailed context, is typical of all three cases. His first transference attitude was expressed as a distrust of me and a veiled fear that I might be dangerous. This was evidenced at first by peeping into drawers and cabinets and behind the couch and chairs for dangerous objects. He asked what I did with the paper knife, with a toy gun (could I shoot him with it), if his hand could be caught in the drawer and cut off, and so on. He complained that some electrical wiring in the room was not safe, that I might hurt someone with it. In attempting to repair an electrical connection of a toy truck, he first asked for help then, with some show of apprehension, refused, saying "you might make it worse, and then it would be ruined." One time, playing with a fountain pen, he squirted the ink, and said it had happened because the pen was broken. He then stated that I must have broken it by pressing it too hard when writing, and explained that it was a delicate object which should be treated gently. One form of play he indulged in was having automobiles collide disastrously. He pretended he was in one car, a woman or a man with a woman in the other; occasionally, a woman was with him. These collisions were always caused by some false move on the part of the woman, and the man was injured. Once the fantasy identified the woman as a false pal who betrayed the patient, because she was really a spy. In this automobile accident, the patient became crippled and he acted out this condition for the rest of the hour by dragging himself around the room with his hands. During this period, he told of a recurrent dream of finding in a garbage pail a dead rat which the maid had caught in a trap and thrown out. This was the recurrent terror dream from which he awakened trembling and, he added, it made him feel as if he himself had been caught and crushed. Telling of this dream followed an unfortunate experience. Coming to my office, he regularly passed a laboratory containing caged cats and frequently stopped to look at them. This day a decapitated cat was on the table, as yet not removed after an experiment. He came to the office trembling and in a rage, accused me of having cut off the cat's head, and wanted to know what other dreadful things I did to animals and people. A little later he created a long fantasy of a vampire, which to him was always a woman, who could bite off parts of his body. He then admitted that his fear of the dark was the fear of such a vampire attacking him. In this same stage of the analysis, he became increasingly critical of his mother. He complained that she punished him for any and everything, that she took away his toys, "monkeyed" with his bi-

cycle and broke it, and interfered with all of his activities. Rather discouragedly he said "The only way to manage is just never to do anything".

Fairly early the patient showed an intense curiosity concerning sexual subjects. He first asked questions voluntarily but tentatively and then, as his boldness increased, disclosed his own ideas on the subject. He (as both of the other boys) believed that sexual intercourse was painful to the man, possibly involving injury to him. The information given by his parents of the sperm entering the egg had been construed to mean that the penis was left in the woman. To explain the fact that a man could have more than one child, he supposed that the organ grew again, but he was in some doubt as to whether this could really happen and, even if it did grow, whether the new organ was as good as the original.

Following the interpretation of his anxieties concerning the destructive rôle of women, and the correction of his fantastic sexual concepts, this boy, as all three, progressed into another stage of positive transference to me. The patient was now friendly instead of critical, was intensely jealous of other patients, drew pictures of hearts inscribed with his name and which he begged me to keep as permanent momentos, and daily brought me gifts. This jealousy, and its implied competition with other patients for my interest, led to another conflict fraught with anxiety. For, if the woman was really not dangerous and the patient accepted the masculine rôle, he was then in danger from the men with whom he competed for the woman. This is the typical oedipus situation, discussed extensively in analytic literature, which represents a general conflict in childhood, rather than a specific one relevant to our present concern.

Of interest in relation to enuresis, however, is the fact that, following the resolution of the anxiety concerning the destructive woman, noticeable changes occurred in the symptoms and manifest attitudes. In two boys, enuresis stopped entirely, not to return; in the third, it changed from a nightly occurrence to a weekly one, when the patient left the orphanage to visit his mother. Three months later, when the fear of his own mother had been more completely worked through and he had returned home to live, the symptom had disappeared entirely. All the boys became more active in play and entered games which they had previously merely observed; their school work improved; dawdling and day dreaming decreased sufficiently to satisfy their parents that they were normal; and night fears were decreased, although they did not disappear until later in the analysis.

As illustrative of the girls all, like the boys, essentially similar, I shall present material from a 7-year-old patient. Her first attitude toward me was one of friendliness and trust, and I became her protector in all fearful situations. The dangerous man came early into her material. A form of play,

rich in fantasies and variations elaborating the same theme, started with a picnic in the country. I was the mother, she the child. There was no father; mostly he was dead, occasionally he was gone for years on a long trip. A dangerous man soon appeared upon the scene, and we fled to a vacant house for protection and had to build complicated barricades to keep him out. He might attack us with knives or injure us by throwing burning brands into the house. A later fantasy, though at the same stage in analysis, acted out in great detail with small wooden figures, was an Indian massacre. The white women were ruthlessly attacked, often scalped, many were wounded and others carried off for further torturing. Of interest was the patient's lack of concern with the fortune of the white men. Once the battle started, they were as if absent, and the total play was concentrated on the fate of the women at the hands of the savage Indians. During this play, she confided that in the dark she was afraid of being attacked by a man with a knife. A second fear was of a cobra possibly hidden under her bed and which might crawl into bed and sting her. Then she elaborated a fantasy, in play with dolls as well as in many drawings, which started in the hospital with a male doctor giving her ultra-violet treatment and causing burns and with a motherly nurse hovering over her, discharging the doctor, and healing her wounds. Incidentally, part of this scene represented a real experience, that of ultra-violet treatments, but she had never been burnt. In a further elaboration of this fantasy, the doctor operated upon the girl and wished to open her whole abdomen. The nurse again scolded and reviled him for his poor surgery and seemed fearful that he might injure the patient beyond recovery. By a skillful kidnapping coup, the nurse then rescued the child from the clutches of the doctor and cared for her at home.

During this period, the patient also told many stories about the stupid boys in school, who couldn't answer questions, and the silly, sissy man who taught gymnasium. She, also, became very critical of the boy whose hour with me preceded hers. In her fantasy, he was a very bad boy who threw stones at girls and chased them with water pistols which shot out poison. In reality, he was a very shy, passive boy. She hardly ever mentioned her father, although she spoke often and freely of her mother, with emphasis on the care and gifts she bestowed on the patient and their easy companionship. Her father was thus mentally eliminated, much as the father in the fantasied picnic party had been physically eliminated. The only comment about her father was that when walking with him, she felt like running ahead and that he talked so much that she was confused and unable to think out day-dreams, as was her usual procedure when with her mother or alone.

Besides eliminating males from her life because of her fear, she disclosed another mechanism, that of masculine identification. This was evidenced in fantasies of being an aviator and surpassing records in height and distance flying, even to circling the earth. She bragged at this time of how she excelled the boys in school in academic achievement, which was true, and in gymnastic achievement, which was not. This she later admitted, but insisted that when she grew older she would be stronger than any man. She stated

then that she could urinate like a man and explained in detail how she had achieved this, during the last two years [and starting about the same time as the onset of her enuresis,] by standing at the toilet. She had practiced sending the stream a long distance and was very proud of her accomplishment. A fantasy connected with urination was the destruction of soldiers in war time by means of a stream of urine. Flying in her airplane, she would herself accomplish this massacre and so become a great hero.

At first the patient had denied sex differences, but later, after the urinary material had been presented, she drew a dog and tentatively sketched in a penis. Then she told very frankly of witnessing a boy's exhibition of himself, and how disturbing this experience had been to her. Then followed questions concerning conception, and in turn her own fantasies on the subject. She had witnessed relations between the parents and interpreted it as an attack by her father upon her mother. She had been given sexual information by her mother, but conceived the act as painful to the woman, the man urinating into her and so burning and injuring her.

As in the case of the boy reported, interpretation of her fear of men, and the correction of her sadistic concept of sex, initiated another phase in the analysis, that of a friendly relationship to men. This was acted out in play, taking the form of the fantasy of two lovers marrying, living happily together ever after, and producing many children. Her enuresis which had decreased during the latter part of the previous period, ceased entirely during this one. She began to go willingly on excursions with her father, which she had previously declined unless her mother accompanied them, and she began to make friends with the boy patient she had so bitterly reviled. Competitive material dropped out entirely from her conversation and play. Similar changes occurred in the other cases at the same stage of the analysis.

In summary, then, we find from the manifest attitudes of these children evidence of passive male and of active female behavior. In analysis, we find that these attitudes are techniques of defense against an anxiety; in the boy, a fear of the woman who becomes dangerous if he is active and, in the girl, a fear of the active destructive male. Passivity thus protects the boy from danger, and enuresis is one passive symptom of the total constellation. Activity, similarly, protects the girl from that passivity which exposes her to the attack of the man, and enuresis is also part of her active constellation, since urination is conceived by her as an aggressive destructive process. And for both, as earlier indicated, the symptom may represent a masturbation equivalent. We do not yet know why this major conflict is expressed by means of the urinary system, but that it is so expressed is shown unequivocally in the analytic material, and particularly by the disappearance of the symptom with the elucidation of the conflict.

Obviously more cases are needed to place these observations on a firm footing and obviously the analysis leaves much yet to be explained, thus the specific situations which created this particular fear, and the choice of the urinary system for its expression. But, so far as any conclusions on a limited number of cases are justifiable, the rich material of the whole analytic procedure and the sharp change in enuretic and related symptoms at a given stage in the child's understanding warrant the conclusion that the type of enuresis investigated in this study is one symptom of an anxiety neurosis, the major cause of which is a fear of the opposite sex.

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CHILD PSYCHIATRY.*

By JAMES S. PLANT, M. D.,
Director, Essex County Juvenile Clinic, Newark, N. J.

In relating child psychiatry to adult aspects of the subject, this paper deals with shifts in emphasis rather than sharp and fundamental differences. Nor does it attempt to enumerate all of those points at which there are these differences in emphasis. It merely indicates three points at which child psychiatry has a considerable contribution to make to the adult field.

It is apparently the stylish thing to say that adult psychiatry deals with more complicated and difficult problems—that child psychiatry, in getting the problem early, gets it in a simpler and more easily modified state. This is not a correct statement of the situation. It is true that as one grows older he more and more personalizes the problems of his environment. Indeed, the process of growing up is largely one of bundling up into one's own personality the problems and tensions which belonged to the adults who surrounded his childhood. Child psychiatry does not deal with simpler problems but rather with problems in a different locus. Its diagnosis and therapy lie largely in the environment.

Because of this personalization, adult psychiatry is preoccupied with relatively dramatic and insistent difficulties. Whether the matter involves the pattern of a whole mode of living (as in dementia præcox) or an apparently isolated, specific complaint (as in some bizarre obsession), the psychiatrist feels that he is dealing with a situation that itself has drive and some sort of unity. In this field, we are dealing with relatively crystallized phenomena which seem to "come from somewhere." Thus diagnosis and nomenclature in the adult field have been in terms of the result produced—in terms of the situation which brings the patient to the psychiatrist. To the extent that psychiatrists trained in adult work have gone into or influenced child psychiatry, there has been this same effort

* Read, as part of a symposium on Child Psychiatry, at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

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Because of this personalization, adult psychiatry is preoccupied with relatively dramatic and insistent difficulties. Whether the matter involves the pattern of a whole mode of living (as in dementia præcox) or an apparently isolated, specific complaint (as in some bizarre obsession), the psychiatrist feels that he is dealing with a situation that itself has drive and some sort of unity. In this field, we are dealing with relatively crystallized phenomena which seem to "come from somewhere." Thus diagnosis and nomenclature in the adult field have been in terms of the result produced—in terms of the situation which brings the patient to the psychiatrist. To the extent that psychiatrists trained in adult work have gone into or influenced child psychiatry, there has been this same effort

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at looking at the child's problem in terms of its "coming from somewhere." However, the real contribution of this field of child psychiatry will lie in the extent to which it preoccupies itself with social or personal stresses which are thought of as "leading to somewhere." This, then, is a second contribution made by child psychiatry—its interest in the cultural and personal loads placed upon persons—its emphasis upon the stresses which lead to maladjustment, rather than in the maladjustment which has been the final outcome of certain processes.

The third alteration in emphasis which is developing in the field of child psychiatry, has to do with the inter-relationship of causal factors. It would be ridiculous to claim that, in the adult field, such a recognition could not occur or that there are not psychiatrists in that field who are not fully aware of the fact that a trait or phenomenon has importance and reality (in respect to a certain result) only in its relationship to the existence of many other traits or phenomena. I could illustrate with the supposition that we now are casting six dice. Suppose that one comes up a one, one a two, one a three, one a four, one a five and one a six. About this, it is very obvious and very tempting to ask two questions; (1) To what total do the six dice add; and (2) which of the dice are the important ones in making this total of 21. A great deal of the research in the adult psychiatric field has busied itself with precisely these two questions. One must admit that a fair fraction of work in child psychiatry has been built on these same questions; volumes have been written on the causes of delinquency, the causes of enuresis, the causes of temper tantrums, etc. Yet it must remain true that because the locus of interest is so much more diffused and because it is more in a number of initiating factors than it is in a relatively simple and dramatic result, it will be in the field of child psychiatry that we shall see that any so-called "causative factor" is such—and has power as such—only in its relationship to other factors. One hopes for the time when we shall cease attempting to relate delinquency, neurosis or psychosis to race, religion, chemical compounds, delinquency area, temperament, whatnot. Each of these factors exists, is important, has reality only as one of the parts of a picture—and to extract it from that picture for the sake of constructing statistical tables, is to rob it of its meaning.

The following cases may in some ways illustrate these three points:

John West was 10 when we first saw him. He was a somewhat tense child, the middle of three in a professional family of considerable means. His older brother, 12, was a rather constant companion, very largely because the parents had thought that their children "should grow up together." The father, an unusually gifted man, "did lessons" with the two boys where he found John the quiet, studious interested member of the pair. Indeed, John played very well with his older brother and there was every superficial appearance of deep regard and mutual admiration between the boys. We were asked to see John on account of his tenseness, but chiefly because he wet and soiled himself. These last activities were particularly annoying as they seemed to come chiefly at times when the child was dressed for some particularly important or festive occasion. The family simply could not accept our recommendations that the two boys build up two entirely different play groups, that one of them soon be sent away to private school and that the father cease carrying on the lessons with the two together. For two years the family did nothing, put up with the inconveniences that John caused and occasionally tried one or another trick advised by kindly neighbors. At 14, the older boy went away to school. Within one week, John's tenseness disappeared and all soiling and wetting disappeared. The change has continued over the last seven years.

Anna was nine when we first saw her. She was in the sixth grade in school where, studious little soul, she was getting good marks. She was fond of school and was much the pet there. We found an I. Q. of about 130 and convinced ourselves that purely within the area of academic intelligence, the youngster could easily cope with her classmates. She was brought to us by her parents who worried about her nail biting, her high pitched voice, her obvious tenseness and rather fitful sleep, and because she was showing an increasing vulnerability in the gastro-intestinal system, with scattered periods of nausea, vomiting and diarrhea. This was a hard case to handle because the youngster had attuned her interests and games to an 11- and 12-year level, and looked upon nine-year occupations as babyish. Anna is an only child and her family valiantly followed us through a pretty difficult program. They moved to the country, they took Anna out of school, the mother went with her once or twice a week to the museums, etc., of New York, they subtly led her to form collections of her own. Companionship with other children was not forbidden but kept at a minimum. Great care was taken to keep the *depth* of interests near the nine-year level, and to substitute breadth and number for what the youngster was otherwise missing. During the next year, a decided improvement in the symptoms appeared. The year after that Anna was reentered in the sixth grade. She is still with slightly older children and even now (three years later) she is not an entirely placid, easy-going type of individual. Nevertheless, she is extremely happy and popular with her new group and the decrease in her "nervousness" has been marked enough to make her family and neighbors consider her as cured.

Bernard we saw two years ago, when he was 11. He is the second of two boys and is two years younger than his brother. That year, the boys were in separate schools (the brother being in junior high) but they still had their play-life entirely together. Indeed Bernard was a good athlete and was a prized member of the various teams his brother played on. The only difficulty was the existence, for four years, of what appeared to be typical grand mal attacks. Bernard was referred because papers had been partially completed for his entry to the State Colony for Epileptics and it was expected that I would act as the second committing physician. There was much in the picture that didn't look like epilepsy. In fact, nothing belonged to that diagnosis except the admittedly typical character of the attacks. Here, again, was a tough job but the family, the school and the recreation leaders fully cooperated. The boy was made an important cog in teams of boys of his own age and younger. A splendid job of building athletic interests at his level was done. About a month after we first saw the boy, there was another typical attack—loss of consciousness, loss of sphincter control, clonic convulsions. Since then there have been no more attacks.

Kenneth, we saw a year ago when he was six and in the first grade. His teacher was at her wit's ends with this restless, jumpy little youngster's disruption of her class routine. Kenneth has a very high I. Q. and had had his play-life entirely with nine-year-olders. He never sat still, his family being quite as distracted over his constant activity as was the school. Kenneth lived in a tight little community where we felt hopeless about changing his play group. Consequently he has been at a small school near enough for frequent parental and home visits but so constructed that he could not compete with the attention span and emotional interests of those three years older than he. Obviously this has required all sorts of resourcefulness in adequate substitution. Let no one mislead himself as to the difficulty of keeping busy these children who have been artificially keyed up to a high pitch. Actually to-day it would be hard to recognize Kenneth. He is still intelligent and alert but he is comfortable and, for the most part, relaxed. He can quietly interest himself for long periods at his games and is playing increasingly with children of his own age. One sees no reason why one more year of this sort of treatment will not solve the situation.

To these four briefly described cases, I should like to add one more. For it, I shall ask each of you to go back to your neighborhood to pick out a boy or girl anywhere from 6 to 14 who is habitually playing with and competing with children some two years his or her senior. I suspect that each of you knows such a child who is not showing, so far as you can discern, the slightest sign of unusual or disturbing tension under this arrangement. I can't deny that *possibly* those children would be even happier and better adjusted if they were not playing with the older ones.

I confess that my naive mind prefers to accept the situation as being often one that apparently produces no outward symptoms.

This paper, while it has not endeavored to present anything that is particularly new or startling, has attempted

A. To emphasize the pressure which we place upon the child rather than the results produced.

B. To indicate that these pressures are dynamic and fruitful only as they are related to other conditions—that there is not any one to one relationship between a given cause and effect.

C. To indicate that nomenclature in child psychiatry, if attempted at all, must be in the field of the types and strengths of the pressures rather than in terms of the symptoms or conduct-picture with which the child comes to the psychiatrist.

D. To call attention to the possibility that the point of break (or presenting symptom) is rather a matter of chance or is, at least for the present, unpredictable. This strengthens our belief that if we are to extend our nomenclature to the field of child psychiatry, it probably must be built in terms of the social problems which the child has to solve rather than in terms of the way he has solved them.

E. To point out that the significant forces are not personalized at this level; that the matters of chief concern lie as much or more outside of the child than within; that while obviously different children react in different ways, we are still at the place where environmental changes can clear the situation which does not go on dynamically developing within the individual.

F. To suggest that these same considerations may, in time, extend into the field of adult psychiatry, to mean that our nomenclature will shift to the cultural pressures involved rather than the symptom pictures shown. From the point of view of therapeutic measures this seems to me a most hopeful trend, though the factor of high personalization of cultural pressures may always mean that cultural changes cannot produce anything like the patient changes which one gets in work with children.

SOME THERAPEUTIC PRINCIPLES APPLICABLE TO PSYCHIATRIC WORK WITH CHILDREN.

By FREDERICK H. ALLEN, M. D., Philadelphia, Pa.

In this paper I would like to give further definition of some principles found applicable to therapeutic work with personality problems in children. This paper will be limited to a discussion of work undertaken directly with the child, and will not attempt to deal with other aspects of treatment that usually accompany and supplement direct work with the child.

The phenomenon of change brought about by the differentiating process of growth is the aspect of the life which always will stir the interest of the student of human behavior. The multitude of influences impinging upon the developing child, with the endless varieties of individual responses to these stimuli provide the constantly revolving stage upon which we can view the drama of human growth with the emergence of individuals, each acquiring through their own experiencing different characteristics.

The psychiatrist working with children has a special interest in the phenomenon of change when he enters the reality of the child's life, through assuming a responsibility for helping him through some of the turmoil emerging out of the growth process. To understand how this special and purposefully undertaken relation can work to influence change in a child, is important to those doing therapeutic work in this area of psychiatry.

In this brief statement, I want to discuss how therapeutic work can be understood as having real meaning for the child when we can frankly accept this new and unique relation for what it is. It is an experience in the child's present and not in his past; it deals with the child as he is, with his strength and his weakness; and the main value may be around helping him to make more creative use of his capacities to establish this new experience, as a start toward more balanced development. While therapy is undertaken around a child's difficulty, it is carried on and built up by what he can put into it. It is related to his strength and is not built up around his weakness and the primary interest is in what he can do and not in what he cannot do.

In the earlier days of psychiatric work with children, little recognition was given to the fact that a child is an active participant in his own growth and therefore a participant in determining the nature of his own reactions. When children were brought into therapeutic procedures it was more for the purpose of fact finding and formal diagnosis than for direct help. Influences designed to help the child were seen as being applied *to* the child. Parents were accepted as holding the whole responsibility of the child; and what he became, good or bad, was thought to be determined by what they did, and that change would follow as their attitudes and feelings were modified.

The therapeutic work done directly with the child frequently was an extension of this principle, with the emphasis on the external influence the psychiatrist brought to bear on the child in the form of direction and explanation. The therapist assumed the heavy share of responsibility for whatever change took place and the child had only to listen, to believe and follow directions. Therapy, both for the child and parent, was seen as process of synthesis through giving. Kanner gives a good description of this externalized type of help when he states this conception of direct work with the child.[1]

> For our purposes and for anyone trained to deal soberly with the concrete facts in the matter it seems sufficient to know that the patient (child) listens to us attentively, understands what we have to say to him, is capable of accepting facts which have been furnished by himself, by his parents, and by an objective examination and is willing to participate in an arrangement which promises to relieve him of his difficulties.

One fact that characterizes the therapeutic relation is that it is in the present, and around the self of the child that has emerged up to that point. Whatever the therapeutic philosophy that is applied, it is around the present child that it works. In recent years there has been considerable emphasis on the genetic approach to the child. The child of the present is approached and understood through the past. Emphasis gets placed on what he has been, as a way of helping him to a healthier way of being what he is now. My own feeling is that such an approach which seeks to use a present relation

[1] Kanner, L.: Child psychiatry, p. 122-123. Springfield, Ill., Charles C. Thomas, 1935.

to reactivate earlier periods of life and interpret present phenomena in terms of earlier experiences and relationships, may and frequently does complicate the growth problem of the child by rooting him more to the very past that aids him to avoid the realities of present living.

The therapist, with this historical approach, will be less sensitive to the meaning of what the child is able to do or what he is doing with the self that has emerged from the past in the relation he has with that child, because what the child does is immediately translated into history. The interest is not in what he *can* do now, but more in what he is unable to do because of earlier experiences and deprivations.

A good example of this strictly genetic approach is given by Bernfelt when he says: [2]

"A phenomenon is not comprehensible to a psycho-analyst unless he can describe how it has come about." He applies this when he says further: "As analysts we dare to 'accuse' a child who is industriously at work on his geography lesson as performing a masturbatory act. We are justified in this manner of speaking if we can show that the particular way in which the child sits quietly and devotes himself to his geography lesson, is derived from actual masturbatory activities that have been combated, changed, suppressed and sublimated." This is another way of stating that nothing is ever what it seems to be, and when that is believed and applied as a cardinal part of a therapeutic approach, naturally the activities and feelings will be taken out of their present setting and given a meaning in terms of a hypothetical and theoretical historical self.

It is interesting to go outside our own professional field and find this critical statement about the historical method. Teggart [3] defines the historical method "as that procedure of explaining or elucidating a given present by stating its antecedents in time," and then states:

"Preoccupation with original documents brings with it a sense of security, a conviction that work based on primary materials must be necessarily sound and enduring. Hence the academic historian holds to the belief that having discovered the facts all that

[2] Bernfelt: Psychoanalytic Psychology of the young child. Psychoanalytic Quarterly. Vol. IV, No. 1, p. 8. Jan. 1935.

[3] Teggart: Theory of history, p. 25. New Haven, Conn., Yale Press, 1925.

remains to be done is to state what he has found without prejudice or bias. It is not to be wondered at, that having adopted this view he should be nonplussed, and eventually irritated when it is pointed out that the end of this effort is a composition of a narrative marked by partisanship and emotion." He further concludes [4] "As a consequence academic history ends in narratives which embody for each generation the human interest of the past, not in statements as to how things work in the word of men." This statement, when applied to the study of human behavior, can have considerable validity as a criticism of the historical approach as the only way to understand present phenomena in human beings.

I have quoted these references for the purpose of giving sharper definition to some therapeutic principles which have grown from a point of view which seeks to begin where the child is in his own development, and help him to find in the self that has emerged, capacities to meet the turmoil of his own growth, irrespective of what has gone before.

From the point of view of the child, the really important thing is what he can feel himself to be now. That is where he will begin irrespective of the point of view of the therapist. Therefore, the basically important goal of therapeutic work with the child is to help him find from this experience, qualities which he can accept as his own and which he can use more creatively in establishing himself in this new and self-limited relation. This can provide a growth experience for the child and offers possibilities for self discovery. It becomes a growth experience when this experiencing of himself is around the person of the therapist. It is the immediacy of this relation that makes this possible. The therapist is not a part of the past, although the child may bring in the turmoil emerging from the past. But in doing this, disturbed feelings no longer belong to the past. They are in the here and now and can be dealt with by both child and therapist in terms of what feelings are now rather than in what they have been.

Objections have been raised that feelings dealt with in these terms represent only superficial and obvious evidence of the child's difficulty and therefore have only temporary value, while the deeper turmoil of the child remains untouched. There is the future ob-

[4] *Ibid.*, p. 75.

jection that only children with superficial difficulties can be treated this way and the more seriously involved neurotic child will need what is commonly called "deep therapy," which means that these feelings must be experienced around relationships and events in the dim and inadequately forgotten past. Anything short of that is distrusted.

My own experience in dealing with seriously disturbed children has led to the opposite conclusion. Such children are rooted to the past and their behavior serves as an important and effective means of avoiding the realities of the present. The more difficult and disturbing task, but at the same time one that can have deeper meaning, is when the child can allow that turmoil to be experienced as a part of this immediate situation in which he finds himself. This is where the psychiatrist has entered the life of the child to help him create an immediate relation that develops its own realities with values and limitations.

For example, a 13-year-old girl with a great deal of neurotic fear tries very hard to keep these fears on childhood events and then fear tenaciously clings to childhood and to her mother as a symbol of it. She begins to do more things on her own and among them was coming to the clinic by herself, a significant and courageous step because it signified more willingness to give up childhood. Around the doing of this, real fear emerges. Helping her to understand and deal with this fear in terms of her present doing, disentangled from all the disguises, had deep and real meaning for this child. She was finding her neurotic fear an effective shield against anything immediate. The real fear came out as she faced her own growing up and her therapeutic experience was a spot where that was beginning to happen. Why do we have to evade the growth value of this immediate experiencing by taking the feeling out of its present setting and pushing it back where it does not belong?

I want to illustrate some therapeutic values that can accrue when the orientation is to the present child, by discussing how some children can focus the fears which have made therapeutic assistance necessary in the relation a psychiatrist can have with a child.

Two aspects of fear must be kept in mind—one is concerned with the causes and the other with the value of fear as a means of control.

Some fear is inherent in the growth process because the nature of growth involves leaving the old and undertaking the new. Fear not only emerges out of the growth process, but may provide the

child with a powerful means of clinging to what he has and resisting the very thing that induced fear, i. e., growing up. Therapy oriented to a genetic approach will, in its determined search for etiological factors, overlook the ways in which fear has come to have value to the child, particularly in the therapeutic relation itself. A valuable illustration of this is provided in Freud's account of the phobia in five year old Hans,[5] the article which has been referred to as the corner stone of psychoanalytic therapy with children. Hans was fighting against any acceptance of his own difference from his mother because that meant growth and leaving her. The mother was making a determined effort to prevent him from growing up and Hans was caught in a dilemma. Fear in the form described emerged as his own growth created an awareness of his own differences, i. e., he had a penis and his mother did not. This organ became the symbol of badness, partly through the handling of his masturbation, but mainly because the penis was the evidence of being different from his mother. Horses seemed to symbolize the bigness to Hans which his own natural growth was creating and his fear was centered around horses. As efforts were made to get at the etiology of his fear, no attention was directed to the obvious determination of Hans to cling to the idea of fear because it had become such a valuable way of controlling his own growth and preventing further separation from his mother. An example of this is provided when his father, who was conducting the therapy said: "As long as you come into our room in the mornings your fear of horses will not get better, and Hans replies in a defiant mood ' I shall come in all the same even if I am afraid.' So he will not let himself be forbidden to visit his mother." I might add, nor would he let anyone, at that time take the fear away because through fear he was in control.

I want to illustrate further some of these points by a brief reference to one aspect of treatment undertaken with a six-year-old boy around an overwhelming amount of fear he was having in most of his life experiences. This behavior was exaggerated particularly in his relations with his mother, who constituted his main source of safety following the death of the father. He was determined not to grow up and the fear which had emerged as he had to meet

[5] Freud: Collected papers, vol. III, p. 189-190.

new experiences, had become his main weapon to fight against leaving anything or letting anyone leave him. I want to give some details of the first interview with this boy because it illustrates one important point of this paper.

He was tense and fearful when his mother introduced me, but he handled this fear by an exaggerated assertiveness in his first hand shake. It was not a friendly shake, but an aggressive pulling of my hand. He left his mother in the waiting room and, when alone with me in my office, he planted his widespread feet firmly on the floor and said, "I knocked you down, I can do it again and I can bring my rope in here." There was a great deal of fear behind this but, instead of recognizing his fear, I joined in and supported him in his verbal statements of aggression. He looked around the room and said, "This all you got here?" and again I joined him in criticizing the place. His name was John but was known as Jack, a name I used. This was too familiar and he responded, "Don't call me Jack, I slap kids if they call me that." I smiled and said, "I guess I had better call you John," and then asked if he knew my name and he blurted, "I will call you anything I want."

Gradually, there was some relaxation but he made it clear that all he was doing was because he wanted to. As he started to play, he said with great determination, "Don't you forget. I am coming in here next Monday" (his correct time), and when I responded, "Would you like to come?", he could not allow the coming to be on liking it but only on controlling it, and said with great emphasis, "I am coming, you better expect me."

He continued belligerent in his feelings and words, but not in action. When he continued critical of everything, I commented, "There doesn't seem to be anything here you want." He replied, "I want the whole place," and referred to the toys as "my toys." I was included in this sweepingly possessive use of liking. What he liked he immediately wanted to own.

In the middle of the hour, I asked what he thought of the idea of coming to see me and he again asserted, "I came because I wanted to," and gave a fictitious story of getting into the car a half-hour ahead of his mother to prove he had come without being asked. He was proving he could be strong enough to keep from submitting to any desire I might have for him.

The natural limits of the hour became apparent when I commented he had 15 more minutes, to which he responded, "Is that so? I think I have 45 and you'll clean this place up when I leave." This was the first assertion around something much more real and he was worried as he watched my face. As I smiled, he relaxed into his first smile of the hour and with more gentleness he asked, "Is this too much noise?" I commented, "What's the trouble, don't you like noise?" He said sure and I told him to make all the noise he wanted. Immediately he assumed control again and said, "I am making noise."

A few minutes later he asked with more acceptance, "How much time do I have?" I told him and he said, "I think I will come in here every day." When I commented, "You are a little upset because you can't," he said with

characteristic force, "But I can." He remained uncertain about making noise and asked, "Are you allowed to make noise in here? Now don't tell me no lies." I responded in terms of his feeling about me and commented he wasn't sure of me yet and he replied, "I am going to make noise."

There followed some determined statements about taking my possessions, and when I commented, "You feel you own what you want," he asserted, "I get what I want." The hour ended in this interesting way. He started putting things away without any suggestion from me but said, "I will put these things back the way I want to and when I get these toys away I am going to leave all by myself," and he did.

I have used this initial interview with a six-year-old to illustrate an important therapeutic principle. Emphasis in this paper has been placed on the value the therapeutic relation itself has for helping a disturbed child to find qualities in himself he can accept as his own and use to establish himself in this new experience. This boy, in his first and crucial hour, found a way of handling his fear by a vigorous assertiveness that was foreign to anything he had shown before. This was a start for this boy to find both the values and limitations of this power in the one relation in his life that had not been built around fear. Strengthening what he had found and helping him live in this relation with the limitations and uses of this more active, alive side of himself, seemed more important than focusing on his fears and searching with him through the recesses of the past, for the specific experiences around which the fears started.

I wanted to help this boy leave the past and deal with the self that had emerged from it. His difficulty was around not being able to give up infancy and he had found fear, which had emerged out of the separating nature of growth, a valuable means of controlling his own growth. He did not have to go back into his historical past to find the cause of his fears as this new experience created its own opportunities for fear and for finding what he had in himself to deal with that fear. As he was able to accept these qualities as his own and use them to bring himself into a more friendly and growing relation with his own reality, he was able to give up his fear as being unnecessary and to resume his growing up in a more balanced way.

Ending a case like this brings in another important element. This boy was moving toward such an easy acceptance of himself. He was quite a different boy and became aware of a desire to end. One

day, in his play, he painted a " for sale " sign and shouted out of the window to find a buyer. When I commented, " You are about through with this place," he denied it at first but later was partly able to accept it. In the next hour, he decided there was not much to do and left 15 minutes early. Everything he was doing with me and in his behavior outside indicated he was about ready to leave after 12 interviews.

But anticipation of leaving and my discussion of it with him recreated some fear and he reacted with a determined statement that he was never going to leave and would come until he was grown. Two alternatives were possible. One, to see the fear as evidence of needing more help and to prolong ending to deal with the feeling that the thought of ending stirred up. This would create a dilemma, because fear again would become valuable as a means of perpetuating a relation he found hard to leave. If he was allowed to continue he would be caught with the fear and this could go on indefinitely. The second alternative involves recognizing that it is just as important therapeutically to help a child to end treatment as it is to help him to begin it. This involved dealing with his determination to avoid taking any responsibility for the ending in spite of his evident desire and readiness to end. This was done and while he continued to make statements that he would come for another year, he did allow himself to end around his own desire, and did so without fear.

This important principle should stand out in therapeutic work with both child and parent. Help must be directed to the more positive aspect of the self, with the interest focusing on what can be done rather than on weakness and what cannot be done.

A child will present a great deal of turmoil in one way or another and may present a picture of needing a great deal. But where the focus of therapy can be around what he has, we can be more sensitive to the ways that the child can begin to bring out and use those positive qualities in this immediate relation to deal with his difficulties. In the case discussed, the important thing for the child was helping him to use qualities in himself to handle his fear as he established himself in this new relation. This he was able to do and, in so doing, moved rapidly toward a different feeling about himself in the realities of his own life.

CONCLUSION.

Therapy emerges from this unique and limited growth experience for a child because it is one established around his own feeling and with a person who has no goal other than helping him to a more creative use of his own potentialities in the realities that the relation itself creates. Through such an experience, he may gain a more positive acceptance of the self that is his and a capacity to relate that self to others and to the responsibilities which growing up involves. Therapy can held a child to catch up with himself and bring himself up to date. If he can do it, therapeutic work has helped him to achieve an important step in his own growing up.

AN EVALUATION OF THE TREATMENT OF PROBLEM CHILDREN AS DETERMINED BY A FOLLOW-UP STUDY.

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AND
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Since 1930, the New York State Psychiatric Institute and Hospital has maintained a ward service for problem boys and girls under the age of 13 years. It has been the policy of the Institute to admit children to this service whose problems were of such a nature that they could not be cared for at home and treated in an out-patient department. Extremely difficult behavior, advanced neurotic symptomatology or psychotic manifestations were the usual reasons for admission; only an occasional patient was admitted for purely diagnostic purposes.

The children's service of the Psychiatric Institute [1] provides the problem child with a temporary escape from undue stresses, strains and insecurities which beset him in his home, his school and his neighborhood; and affords a tolerant, understanding environment which exacts a reasonable compliance to a few simple rules and regulations. The idea of treatment is uppermost and is regarded as a 24-hour-a-day problem. Treatment is widely conceived and is carried out through re-educational work, school room instruction, modified occupational therapy, dramatics, weekly trips throughout the city for diversional and educational purposes, collective games and parties, etc. Many of the children have extensive psychotherapeutic sessions [2] with a psychiatrist and the key person in the family has continued interviews with a psychiatric social worker throughout the child's stay in the hospital.

[1] Potter, H. W.: A service for children in a psychiatric hospital, Psychiatric Quarterly, 8: 16-33, 1934.

[2] Potter, H. W.: Psychotherapy in children. Psychiatric Quarterly, 9, pp. 335-347, 1935.

All children included in this study had been discharged at least a year prior to the date of the follow-up contact. The follow-up study consisted of a personal interview with the parent and child by the psychiatrist, and a visit to the home and school by a psychiatric social worker.

Inasmuch as social maladjustment or neurotic symptoms usually bring the problem child to the attention of the psychiatrist, these were used as a basis for evaluating the condition of the patient as observed at the follow-up contact. If the child was getting along well at home, in school and in the neighborhood, and was free from symptoms, his adjustment was recorded as *satisfactory;* otherwise, *unsatisfactory*. In certain instances, some of the children showed an optimum improvement but their own constitutional limitations (mental defect) or the limitations of their environment (a psychotic mother) were of such a nature that even with their optimum improvement they were unable to attain a satisfactory level of adjustment.

In order to compare outcome with causative conditions and clinical reactions, the cases were classified as follows:

I. The Organic Reaction Group (including idiopathic epilepsy):
   A. Idiopathic epilepsy.
   B. Mental deficiency.
   C. Juvenile paresis.
   D. Behavior problems secondary to organic conditions.

II. The Situational Reaction Group:
   A. Personality and habit problems.
   B. Conduct disorders.
   C. Psychoneuroses.

III. The Psychotic Group.

THE ORGANIC REACTION GROUP (INCLUDING IDIOPATHIC EPILEPSY).

Present social adjustment.	Idiopathic epilepsy.	Mental deficiency.	Juvenile paresis.	Secondary behavior problems.	Total.
Satisfactory	3	5	0	2	10
Unsatisfactory	6	22 *	7	19 †	54 ‡
Total	9	27	7	21	64

* 2 dead. † 1 dead. ‡ 3 dead.

Idiopathic Epilepsy.

These patients were admitted in order to evaluate the nature of their convulsive seizures. In some, a primary psychogenic factor was suspected but was not supported by further study. The three patients who are making a satisfactory social adjustment had only petit mal phenomena and although the petit mal seizures persist, they are not of sufficient gravity to interfere with the child's adjustment.

Mental Deficiency.

The mental defect in these 27 patients was evidently congenitally determined. In the older patients, the mental deficiency was associated with behavior disturbances and in the younger, with schizoid traits. Twenty-two were of moron level and five of the imbecile grade. Only five of the total group were making a satisfactory adjustment and were regarded as well adjusted defectives at the time of the follow-up study.

Juvenile Paresis.

In each of these cases the clinical course of the disease was arrested but no remissions occurred. All were in an advanced stage of the disease at the time malaria and tryparsamid therapy was instituted. None of the seven in this group show a satisfactory social adjustment.

Secondary Behavior Problems.

Cases in which the behavior problem, characterized by uncontrollable aggression, was a direct expression of a demonstrable physical disability or organic condition. With one or two exceptions, these patients were admitted for diagnostic study and observation. In 15 of these patients, the behavior disorder was associated with encephalitis; in two, with post-traumatic brain changes; in one, with deaf mutism; in one, with a mild hydrocephalus; and in two, with dyspituitarism. The two patients in this group making a satisfactory social adjustment are the deaf mute, who is now a happy, contented child attending a school for deaf mutes, and the patient with hydrocephalus.

THE SITUATIONAL REACTION GROUP.

Social adjustment.	Personality and habit problems.	Conduct disorders.	Psychoneuroses.	Total.
Satisfactory	14	26	15	55
Unsatisfactory	11	25 *	6	42 †
Total	25	51	21	97

* 1 dead. † 1 dead.

These 97 children were free, so far as an examination could determine, from any organic or somatic condition which might have furnished a basis for their personality or behavior problem. Sixteen of these patients were in the hospital for a period of less than three months and were removed against advice before a reasonable period of treatment had transpired. Seventy-two spent from 3 to 12 months in the hospital and nine remained for well over a year.

Personality and Habit Problems.

Enuresis, masturbation, faulty habits of eating and sleeping, mild temper tantrums, timidity, shrinking from social contacts, speech disturbances and non-aggressive oddities of behavior which appeared to be expressions of larval forms of psychoneurotic or schizophrenic reactions. Here, the successes and failures, in terms of present social adjustment and presence or absence of the symptoms which necessitated hospitalization, are about equally divided, 14 being considered satisfactory, and 11 unsatisfactory.

Conduct Disorders.

Problems of aggression against persons and property, destructive and belligerent rages, running away from home and school, stealing, setting fires, sadistic and cruel treatment of other children, rejection of authority, incorrigibility, disobedience, etc. Of these, 26 show satisfactory social adjustment, and 25 unsatisfactory.

The successes and failures are thus about evenly divided. When grouped according to intellectual equipment there was not a sufficient number in any group to draw any definite conclusions as to the effect of the intellectual equipment on ultimate adjustment. However, the distribution suggested that of those with superior intelligence showing I. Q.'s above 110, the majority made a satis-

factory social adjustment; albeit, those with I. Q.'s in the dull normal group (75 to 89) did almost as well as the total in the conduct disorder group.

Psychoneuroses.

Anxiety states, panics, phobias, conversion phenomena, obsessive thinking, compulsive behavior, tics of various sorts, hypochondriacal and neurasthenic like complaints, in distinct psychoneurotic constellations or patterns. The end results, as judged by present social adjustment and freedom from neurotic symptomatology, were better in this group than in any other; 15 out of 21 were socially adjusted and free from symptoms at the time of the follow-up interview.

Since the situational reaction group, comprising conduct disorders, personality problems and psychoneuroses, is that group of problem children who would be expected to respond most favorably to treatment, we made an attempt to find some correlation between satisfactory social adjustment or unsatisfactory social adjustment and other factors in the case history. We approached this question from various angles; age on admission, duration of hospital residence, elapsed time between discharge from hospital and follow-up contact, intelligence, home conditions, and direct psychotherapy. The number of cases in any one grouping was not sufficiently large to warrant any conclusive statement, and in addition, there were so many intangibles in the treatment situation itself that we feel it inadvisable to draw any positive conclusions as to the reason for the kind of social adjustment made by the various patients. We do find a suggestion, however, that those children with superior intelligence (I. Q. 110 plus), those in the preadolescent years (10 to 13), those who showed a definite and marked response during the first six months of treatment, and those whose parents had faulty attitudes rather than psychoses or psychoneuroses, have a definitely better prognosis.

THE SCHIZOPHRENIC REACTION GROUP.

There were 14 cases in this group. These patients presented characteristic symptoms of dementia præcox. A diagnosis of encephalitis was excluded in each instance. The life history was negative for retarded mental development during the period of

infancy or the early pre-school period. Symptoms such as acute apprehensive states, confused or incoherent talk, mutism, negativism, hypersuggestibility, phobias, regressive habits or behavior, withdrawal of interest, suspiciousness, stereotyped behavior, obsessive compulsive phenomena, attitudinizing, neologisms, etc., appeared at varying ages, from the third year on. Four of these patients showed some improvement at the time of discharge from the hospital but these as well as the others, except one, have undergone further deterioration since. Only one patient, of the entire group of 14, is making a satisfactory social adjustment in that he is attending school, is up to grade, is a satisfactory member of the family group and is making a passive kind of adjustment with the children at school and in the neighborhood.

Schizophrenia occurs so infrequently in young children that it may be of interest to give a brief clinical sketch of each of these patients.

S. K. Onset at age of three years, with apprehensiveness, resistiveness and excited, productive, incoherent talk. When admitted at the age of four, patient soiled and wet himself, was mute, resistive and cataleptic. There was also attitudinizing and stereotyped repetitious movements of hands and arms. His reaction was detached and indifferent, with episodes of unprovoked acute anxiety and rage. At the age of eight, he is in a state school and is apathetic, indifferent, constantly masturbating and mute.

S. A. Onset at about three and a half years, with apprehensiveness, screaming attacks and a rapidly ensuing mutism. Admitted at the age of five years, with frequent unprovoked attacks of rage in which patient would strike his face and vomit. He was generally apprehensive and later showed complete indifference apathy, and jargon speech or mutism. He was likewise resistive, negativistic and seclusive, displaying stereotyped movements. At the age of seven, his condition remains unchanged. He is at home but the parents feel that they will soon have to seek institutional care for him.

M. E. Onset indefinite. At about the age of five years patient became gradually indifferent, irritable, with outbursts of silly laughter, gradually becoming less productive in talk. On admission at six and a half years, there was wetting and soiling and open masturbation, he fondled the nurses' breasts at every opportunity and was disinterested, indifferent, seclusive and neologistic. Echolalia, attitudinizing and stereotyped movements were also manifested. At the age of nine, he is in an institution and unchanged in his condition.

J. M. Onset at the age of three with excitement, apprehension, belligerent rages, incoherent speech and mutism. On admission at the age of six, was mute, seclusive, negativistic, inattentive, indifferent. Also, there were fits of

rage and open masturbation, stereotyped movements, attitudinizing and compulsive behavior. At 10 years of age, patient is in an institution, indifferent to his surroundings although seeming aware of them. He cooperates in a passive, automatic way.

R. L. Onset at three and one-half years, with masochistic rages, sleeplessness, wetting and soiling and rapidly developing mutism. On admission at age of seven patient was excitable, cruel and bit self and others in impulsive rages, she smeared faces and masturbated openly; likewise, she showed mutism interspersed with echolalia and was emotionally detached, seclusive, negativistic and extremely resistive. At the age of nine, she is hospitalized in a psychiatric hospital and although amenable and no longer excited, is fundamentally unimproved.

T. R. Onset at five years, with purposeless wandering away from home, fanciful disconnected stories, rages and irritability. On admission at age of nine, patient had frequent belligerent rages, wet and soiled himself and was incoherent in speech. Also, he was emotionally detached and at times apprehensive and seclusive. At the age of 11, he is living at home, goes to a small private school but is making no progress, is completely asocial, afraid of other children and emotionally inadequate.

M. S. At age of four, patient began to be indifferent to commands, inattentive, had temper tantrums and was silly in his talk. On admission, at nine years of age, he was resistive and overactive in a detached purposeless manner, disinterested, indifferent, seclusive and rather fearful generally. There was also inappropriate laughter and patient displayed a compulsion to poke his finger into the eyes of others. At the age of 11, he is living at home, is obedient and even tempered, and cleanly in his toilet habits. Patient is less timid but does not show any interest in playing with other children. There is still a good deal of inappropriate silly laughter and he is regarded as "queer" or "odd" by other children.

J. S. Onset gradual at age of nine, with gradually increasing retraction of interests, irritability, and preoccupation. On admission at the age of 10, patient was restless in a purposeless detached way, had occasional rages and was generally indifferent and preoccupied. He was, in addition, seclusive, wet and soiled himself, grimaced a good deal and reacted to auditory and visual hallucinations. At the age of 16, he is living at home and is a sophomore in high school. He is well behaved, cleanly, and although he has no interests in common with his associates, he appears well adjusted and free from psychotic symptomatology.

R. S. Onset at six years with anxiety, fears, doubts, and periods of excitability. Admitted at the age of 10, with facial tics, misophobia, hand washing compulsion and complaint of buzzing noise in head. He was preoccupied, tense, confused, incoherent at times and seclusive. Inappropriate laughter was likewise manifested and patient's attitude was one of questioning doubt. At age of 13, his condition is essentially unchanged and he is in a state psychiatric hospital.

D. W. Onset at age of seven, with rebelliousness at school, senseless stealing, rages, and disobedience at home. On admission, at the age of 11, he was excitable, irritable and told fantastic stories with homosexual content. Besides, patient had fits of crying, fears of the dark, was suspicious and complained of being "picked on and disliked" by other children. At the age of 15, he is in a state psychiatric hospital and has a well developed paranoid trend, relating to his being "framed" and spied upon. He complains, too, respecting secret dictaphones.

H. H. Onset acute at the age of 10½, with excitement, anxiety and fears. On admission, at the age of 11, patient was excitable, confused, overtalkative in an incoherent rambling manner, fearful, and had many delusions relating to somatic disintegration. In addition, auditory and visual hallucinations were present. At the age of 16, he is in an advanced hebephrenic condition in a psychiatric institution.

D. A. Onset acute at the age of 10, with excitement, apprehensiveness, and belligerent rages. On admission at age of 11, there was wetting and soiling and much oral sadism. Patient was preoccupied, indifferent and made impulsive assaults, also, he was seclusive, grimaced, and manifested delusions of a grandiose nature and ideas of somatic disintegration. At 16, he is in an advanced state of deterioration in a mental hospital.

B. N. Onset at age of eight, with an acute confusional excitement, characterized by apprehensiveness. Admitted at age of 12, patient was confused, perplexed, detached, seclusive and incoherent in speech, with much blocking. There was also fear of death and visual and auditory hallucinosis. This patient, at the age of 17, is living at home and in a moderately deteriorated hebephrenic state.

S. G. Onset at the age of 11, with belligerent rages against his mother and states of apprehensiveness. On admission at age of 12, he was irritable, seclusive, fearful, suspicious, excessively neat and had persecutory notions directed toward his mother. At the age of 15, he is living at home, extremely negativistic, refuses to eat with the family, is abusive toward his mother, and makes no social contacts.

SUMMARY.

Social adjustment.	Idiopathic epilepsy.	Mental deficiency.	Juvenile paresis.	Secondary behavior problems.	Personality and habit problems.	Conduct disorder.	Psychoneuroses.	Schizophrenia.	Total.
Satisfactory	3	5	0	2	14	26	15	1	66
Unsatisfactory	6	22*	7	19†	11	25‡	6	13	109§
Total	9	27	7	21	25	51	21	14	175

* 2 dead. † 1 dead. ‡ 1 dead. § 4 dead.

To recapitulate, this is a report of the outcome of 175 problem children whose maladjustment in the majority of instances was so severe that it necessitated hospitalization. No case included in this report had been out of the hospital for less than one year; well over half of the patients had been out three years or more. So far as the treatment accorded is concerned, it may be said that it was widely conceived and was both extensive and intensive except for those 64 cases belonging to the organic reaction group. There were 64 cases in the organic reaction group; ten of these were making a satisfactory social adjustment at the time of the follow-up contact. We wish to state, however, that for administrative reasons, we found it inadvisable to attempt a long term treatment of these cases. More adequate treatment might have resulted in a larger number of social recoveries.

The results in the situational reaction group (conduct disorders, personality and habit problems and psychoneuroses) were gratifying, as 55 out of a total of 97 were making a good social adjustment when the follow-up contact was made. The percentage of children making a satisfactory social adjustment was definitely higher in the psychoneurotic group. It is our impression that children who have superior intelligence, who are in the prepubertal years (10 to 13), who show a definite response to treatment during the first six months, and whose parents, although having faulty attitudes, are free from well defined neurosis or psychosis, have the better prognosis.

The outcome of the schizophrenic reaction group is exceedingly poor; only 1 out of 14 has made an at all satisfactory readjustment; the remainder became progressively worse. This certainly emphasizes the constitutional inadequacy factor, whatever it may be, in those cases which we call schizophrenia in children.

PROBLEM CHILDREN GROWING UP.*

By LEO KANNER, M. D., Baltimore, Md.

Studies of the development of ergasic disorders of adults have led psychiatric interest to a consideration of early personality formation. Studies of the behavior difficulties of children have raised the question of their significance as indications of future adjustment tendencies. Thus there is one arrow pointing backward from adulthood problems to their origins and evolutions, and another arrow pointing forward from childhood problems to their life-shaping potentialities. Reconstruction of devious careers has rightly become an integral part of psychiatric anamnesis, but the path of the second arrow has rarely been followed through from childhood to adulthood. Child guidance clinics, school adjustment centers and juvenile courts are usually compelled by the pressure of ever new demands to drop their relationships with older patients in the face of improvement, lack of coöperation, change of residence, referral to a social agency, institutional placement, graduation from school, termination of the court probation period or, quite often, a gradual and spontaneous loosening of mutual contacts.

During the last few years, attempts have been made to follow the destinies of individuals from the pivotal events revolving around early personality difficulties. In 1930, Sheldon and Eleanor Glueck [3] published their challenging account of the careers of 500 boys discharged from a reformatory. In 1933, Fairbank [2] reinvestigated 212 persons, 17 years after they had been studied at school age by Campbell as part of a district survey program. In 1935, Thom and Winslow [9] presented the results of a follow-up study of 50 problem children who had been given a poor prognosis, and 50 who had been given a good prognosis, finding in asocial tendencies a criterion by which future difficulties of all-round adjustment may be anticipated. Berk, Lane and Tandy [1] observed

* Read, as part of a symposium on Child Psychiatry, at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

the progress of 30 children who had manifested delinquency problems before the age of 10 years. In 1936, Hubbard and Adams [5] dealt with the factors affecting the outcome of child guidance clinic therapy of 100 children, considering the situation both at the time of referral and as it developed under treatment by the clinic.

In 1934, a follow-up program intended to cover the course of childhood, adolescence and early maturity was launched at the Harriet Lane Home, the pediatric department of the Johns Hopkins Hospital, where psychiatric service had been begun in 1930, in close connection with the Henry Phipps Psychiatric Clinic. The ages between a few months and 14 years at the time of the first examination were represented, and attention was given to every complaint for which a child was referred. The case material therefore includes cerebrogenic, endocrinogenic and toxic conditions, problems of sick and convalescent children, adjustments of the neurologically and orthopedically handicapped, innate personality disorders, reactions to situational stress, and the so-called everyday problems of the everyday child. An effort was made from the start to record the essential biographic, physical, intellectual, emotional, conative, environmental and constitutional factors in each case.

Between four and six years after a patient's first clinic visit, Miss Polly Bouck, a psychiatric social worker especially engaged for this purpose, made a study of the situation as it then prevailed. Data were obtained about the family's contacts with relief and other agencies whose records often threw much light on economic conditions, work habits, social attitudes and living standards. Interviews with school teachers brought information about progress in the child's studies, behavior in the classroom, regularity of attendance and type of parental coöperation. A visit to the home gave additional knowledge of stability of residence, neighborhood features, domestic routine, the family members' attitudes towards each other, the patient and the clinic, and any improvements or new difficulties that may have developed. Reëxamination at the clinic covered the child's state of health, scholastic abilities and interests, recreational activities, feelings towards family, teachers and playmates, ambitions, moods and habits, manner of getting along with people and, of course, the cessation, improvement, con-

tinuance or aggravation of the problems originally complained of. Attention was paid to the degree to which the child, the family, the school and the social agencies had been willing or able to carry out the clinic's recommendations, which themselves came in for a test of their soundness and applicability. Whenever indicated another intelligence test was given, a new physical examination was arranged or plans were made for renewed treatment of the old disorder or of problems that had arisen in the meantime.

Two hundred and thirty cases have thus been investigated or are now under investigation. The first 75 patients about whom reasonably complete information exists form the basis for this report. This group consists of 43 boys and 32 girls, 70 white and 5 colored children. There were six pairs of siblings and one pair of first cousins among them.

The age distributions at the time of the first consultation (between November, 1930, and February, 1931) and at the time of the follow-up were as follows:

Age at first consultation.		Age at reinvestigation.	
Age in years.	No.	Age in years.	No.
1	1	5	1
2	4	6	4
3	6	7	6
4	7	8	5
5	4	9	5
6	5	10	5
7	8	11	7
8	6	12	6
9	7	13	7
10	8	14	7
11	6	15	8
12	6	16	6
13	6	17	7
14	1	18	1

This group differs in its composition markedly from groups of equal size that come before the average child guidance clinic and those studied at our own clinic at later periods. When consultation service was first introduced at the Harriet Lane Home, the pediatricians began by seeking advice regarding obvious and striking maladjustments before referring children with milder and

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tinuance or aggravation of the problems originally complained of. Attention was paid to the degree to which the child, the family, the school and the social agencies had been willing or able to carry out the clinic's recommendations, which themselves came in for a test of their soundness and applicability. Whenever indicated another intelligence test was given, a new physical examination was arranged or plans were made for renewed treatment of the old disorder or of problems that had arisen in the meantime.

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5	4	9	5
6	5	10	5
7	8	11	7
8	6	12	6
9	7	13	7
10	8	14	7
11	6	15	8
12	6	16	6
13	6	17	7
14	1	18	1

This group differs in its composition markedly from groups of equal size that come before the average child guidance clinic and those studied at our own clinic at later periods. When consultation service was first introduced at the Harriet Lane Home, the pediatricians began by seeking advice regarding obvious and striking maladjustments before referring children with milder and

subtler difficulties. Hence major disorders figure more prominently in the cases under consideration. Whereas, for example, idiocy is represented in only 0.63 per cent of our total of 2400 patients, there are not less than 6.7 per cent idiotic children among the 75 reported in this study.

This report is not a final product but rather the result of temporary taking of stock, a resting point on the road to further observation of these children in the years to come. Its purpose is to show how they have progressed, what they have done and what has happened to them. No attempt is made to evaluate developments in terms of "cure" and "failure." Where the issue was centered around sweeping maladjustment, curiosity is directed towards the present state of the child's adaptation to his environment and the environment's adaptation to the child. Where the issue hinged on more specific disorders, attention is paid to these "symptoms," plus the factors determining the place now occupied by the patient in the general scheme of things. It would be much easier to state merely that so many enuretics now do or do not wet their beds or that so many breathholders now do or do not hold their breaths. Yet though the cessation of enuresis and breath-holding spells is doubtless a part of the therapeutic aim, the complaint is also a means of introducing a child, a situation and varying needs for corrections of bodily conditions, attitudes, parental management, grade placements at school and modes of interpersonal relationship. Complaints, such as of mild tics or nightmares, are sometimes associated with difficulties of a magnitude compared to which consideration of the symptoms itself must take second place. Hence our follow-up puts no less emphasis on the child and the situation than on the complaint that has served to introduce them.

In 26 of the 75 cases, feeblemindedness formed the nucleus of the difficulty. Under ideal circumstances, institutional placement would have been recommended for most of them. In the years of the depression, such facilities have been greatly reduced, so that only the most pathetic victims of dependency and neglect had any chance of admission.

Of 10 idiots and imbeciles, William B. is in a private institution; Morton F. was placed in the State Training School in 1931, re-

moved from there against advice and returned in 1935 when he became a menace to his baby brother; Irene L., committed with much difficulty, was stolen from the School by her mother, returned by the police, granted a few days' vacation to a relative who never brought her back; Julia K., Pauline B. and Antoinette L. are badly managed by feebleminded parents who would not consent to their placement; George N., convulsive, blind and hemophilic, is at home because a long waiting list has so far kept him out of the Training School; Gilbert K., a placid Mongolian, and Mary S., a good-natured cretin, are well supervised at home; Leo W. is not as yet considered abnormal by his deficient parents and his parochial school teachers.

Of 16 morons, eight had been referred because of poor progress at school. In the other cases, the main concern was reported as (1) restlessness and bad temper; (2) food capriciousness, temper tantrums, stealing; (3) hydrocele, the correction of which was expected by the mother to bring about improvement of vision and intelligence; (4) baby talk and stuttering; (5) enuresis, restlessness, sensitiveness; (6) indistinct speech and spoiled child reaction; (7) masturbation with fear that the child would "lose his mind"; (8) anxiety attacks.

Six of the children were placed in special classes for retarded pupils, two remained in parochial schools where they are doing poorly, four continued in rural schools which have no special classes, one went to a hearing conservation class, one to a school for blind children, and one was carried with poor success in a regular grade of a city school. Two girls left school at the age of 16 years; one is a well-behaved cretin who helps her mother with the housework, the other a city girl who manages to mask her retardation under an attractive exterior and is looking for a simple type of job. Application for admission to the State Training School was made for one child but he has not yet been accepted there.

As for "symptoms," all six instances of enuresis, two each of temper tantrums and restlessness, and one each of breathholding spells, masturbation, encopresis, sleepwalking and anxiety attacks were no longer present after four years, while temper tantrums and speech disorders persisted in three cases, restlessness in two, and food fussiness and stealing in one case each. Nine of the children are moderately well adjusted.

Of the others, Thomas F. has the double handicap of feeble-mindedness and blindness; Emily K. is deaf and has developed hypochondriacal trends; Elmore H. is troublesome at school and often plays truant; Albert H. indulges in petty stealing; John S. is reported as being heedless of danger; Otto B. masturbates openly in the classroom and beats smaller children; Wilbert McC., now 17 years old, has fierce temper outbursts, has forced sex relations on his brother and attempted to choke his mother and a little girl; when his father, who refused to have him committed, deserted the family in 1936, his mother asked that Wilbert and another feeble-minded son be sent to the State Training School but never filed the application, so that Wilbert is still at large.

Of the remaining 45 children, 12 fell in the group of borderline intelligence, 17 were dull normal, 12 were normally intelligent and eight were of superior intelligence. The myth of the constancy of the I. Q. has been exploded by Hildreth,[4] Richards [8] and others. Even in our small group, the I. Q. dropped within a few years ten or more points in 7 cases, and rose ten or more points in five. One of the increases occurred in a thyroid-treated cretin, one after recovery from lead encephalopathy. In the others, relations between the I. Q. changes and specific responsible factors could not be established with any degree of certainty.

Thus not even the I. Q. affords prognostic security, which is further influenced by unpredictable contingencies. Morton L. was rid of his tics and night terrors when he succumbed to meningococcus meningitis in 1936. Sidney K. had overcome compulsive habits when sarcoma required leg amputation in 1936, with death now imminent. The family pattern was altered noticeably by death of one parent in five cases, of both parents in one; serious illness of the mother in two; parental separations in 11 and reconciliations in four; the mother's remarriage in one; the arrival of new siblings in nine; change of residence in three; economic changes for the better in three, for the worse in 12, fluctuations in five cases. Four patients incurred accidental injuries, two resulting in cerebral concussions. Three underwent appendectomies and one a mastoid operation. Three each had pneumonia and bronchitis during the interval, four had measles, two had chicken-pox, one each had scarlet fever, pertussis, dysentery and gonorrhea, and one spent a few months in a tuberculosis sanatorium.

The difficulties of the children with I. Q.'s above 70 consisted mainly of reactions to illness in four (congenital malformation of the heart, celiac disease, lead poisoning, epilepsy), parental spoiling and oversolicitude in 18, maternal rejection in two, strain and stress at home in 10, at school in eight, and both at home and school in six. Sixteen of 47 patients are now doing well in every respect; 21 have made fair adjustments and give no cause for serious concern; 10 are poorly adjusted and require intensive psychiatric and social work which, in 5 cases, is carried on in collaboration with the juvenile court. Apprehension is justified regarding three boys and one girl whose delinquent acts and anti-communal attitudes have taken a turn for the worse. One colored boy has landed in a reform school. The school situation, comprising comfort, conduct, attendance and achievement in grades adapted to the pupil's abilities, is satisfactory in 17 cases, fair in 12, and unsatisfactory in 10. Of eight pupils who left school at 16 years of age, one is employed as telephone operator, two in domestic service, one helps at home, two are unemployed, and two are unemployable because of their personality difficulties. Parental cooperation was excellent in the work with 13 children, fair in 20 cases, and poor in 14. As regards the original complaints, hypochondriacal trends and invalid reactions yielded most readily to therapy. All nine patients so affected, as well as their families, could be made to acquire healthier attitudes towards health. All three instances of tics, two of pica and one of encopresis have cleared up completely under treatment. Enuresis was no longer present in 9 of 14 children, food capriciousness with or without vomiting in 8 of 13, temper tantrums in five of six, marked restlessness in one of three, speech difficulties in two of four, and truancy and stealing each in three of four children.

As one might expect, the best responses to treatment were obtained from the combination of stable and intelligent children, sound ancestry, tolerable home conditions and good family, school and communal coöperation and facilities. The more of these features were absent, the less gratifying are the results. Yet sometimes much could be done for a child even though parental understanding and coöperation were lacking and the general environmental conditions did not change appreciably.

George H., Alfred B. and Alvin C. are examples of these three categories: George, nine years old, healthy, I. Q. 118, had dramatic attacks of shortness of breath as reaction to false asthma alarm in connection with bronchitis, maternal oversolicitude, insufficient recreational outlets and sudden loss of friends due to change of residences and schools. Removal of the child's and family's scare, supply of play possibilities, visits to his former playmates and good coöperation did away with the trouble within a short time and made for good general adjustment. Alfred, 12 years old, undernourished, I. Q. 76, restless, given to temper tantrums, enuretic, a masturbator, doing poorly at school, grew up amidst violent fighting between an alcoholic, tyrannical father and an hypochondriacal mother who neglected her children; several relatives were psychotic and he himself had had infantile convulsions. Nothing could be done to change the horrible home situation or to board Alfred, who at 18 still has the same difficulties and failed in several places of employment provided for him with the help of the clinic. Alvin, 10 years old, healthy, very childish, restless, mischievous, not progressing at school despite an I. Q. of 134, playing truant, stealing, lying, staying out late, blinking his eyes and shrugging his shoulders, comes of a home kept in constant uproar by his matrimonially disappointed, chronically excited, forever agitated mother, whose spineless husband has and claims no voice in domestic affairs. Alvin, followed closely for several years, has learned to emancipate himself from his mother's domination, conform to reasonable rules and conventions and balance his work and play habits and has rid himself of his earlier difficulties, of which blinking is the only residue. Though the home conditions remain the same, he is now quite well adjusted, has matured considerably, does satisfactorily at school and has developed a nice sense of humor and tolerance.

SUMMARY.

A brief résumé of a follow-up study of 75 problem children is presented after the first interval of between four and six years. The present mode of adjustment is reviewed in its relations to health, intelligence, home and school conditions, family coöperation, the rôle of unpredictable contingencies and the complaints with

which the patients had been first brought to the clinic. The need for brevity has precluded detailed accounts of individual cases which, however, are drawn on succinctly to serve as illustrations. There is hope for continuation of the follow-up of these and other patients for at least the coming decade. Studies of this nature may help to throw light on prognostic expectations, furnish empirical data about actual developments and their determinants, intrench respect for relativistic pluralism in the investigation of human behavior and show the way to the improvement of existing imperfections of psychiatric therapy and communal resources in dealing with problem children.

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DISCUSSION ON CHILD PSYCHIATRY.

Dr. James K. Everhart (Pittsburgh, Pa.).—Mr. President, we have witnessed in recent years an ever-increasing invasion of the field of psychotherapy by lay analysts, psychologists with a smattering of analytic knowledge, certain others who have taken a course in analysis, and various other persons poorly equipped and untrained, yet confident that they are qualified for the serious and difficult task of attempting to treat sick persons by analytic methods.

Mental healing is without doubt one of the oldest therapeutic measures used by mankind. What is of vastly more importance is the fact that mental healing is gradually being divested of its supernatural and mysterious aspects; its basic truths and principles are being unfolded, with the result that psychotherapy is being brought more and more into the domain of scientific medicine.

It is difficult for some of us to separate the physical from the mental. It is not yet universally understood how emotional disturbances affect functional and organic processes. Psychiatrists have long recognized this but it would seem that the need is for more frequent recognition of psychiatric problems by all medical men. Our progress has been for so long a time along the obvious lines that mental and emotional problems of life have been neglected or overlooked.

Certainly the pediatrician needs the psychiatrist and if psychiatrists would only speak in simpler terms and talk to us in easily understandable language, I have no doubt it would help us greatly in practical application of some pediatric principles.

However, I have neither the desire nor the qualifications to discuss controversial issues. My interest in the subject is solely as it can be applied to the practical, every-day problems of those who are dealing with children, whether it be the pediatrician or the so-called general medical practitioner. The physician who deals with the child should consider the child as a whole—his mental as well as his physical side.

In 1889, the beloved Dr. Jacobi said, in the first presidential address delivered before the American Pediatrics Society, these words:

"Unless the education and training of the youth is carried on according to the principles of a sound and scientific physical and mental hygiene, neither the aims of our political institutions will ever be reached nor the United States fulfill its true manifest destiny—of raising the standard of physical and mental health to possible perfection."

The pediatrician who would share in the noble aspiration of Jacobi must be a teacher and adviser. This function devolves not alone upon the pediatric instructor in colleges and hospitals and in public and child welfare agencies, but decidedly on the practicing pediatrician, the family adviser, in all questions concerning the well being of children.

In dealing with problems of childhood, parents definitely enter the picture. Unquestionably, many problems are imposed upon the child by his parents. The family is, of course, the most powerful force in the emotional development of the child, but the family is still an imperfect institution. A majority of families are, after all, charged with undercurrents of jealousy, resentment, and all sorts of feelings not conducive to the healthy development of the child. Parents are so preoccupied with the child's physical and intellectual development that they forget emotional development. This may be accounted for on the basis that the child's physical and intellectual problems can be recognized as separate from the parents' own physical and intellectual problems, whereas the child's emotional problems are part and parcel of the parents' own emotional problems. This means a loss of objectivity. Many parents are often unable to give the child the sort of emotional guidance that is needed.

Parents frequently are unable or unwilling to recognize this. Thus we have not only the child but also parents to deal with, and as we all know, the latter often are more difficult than the child himself. A large part in the successful handling of these cases lies in our ability to give parents a better understanding.

Our experiences and observations have convinced us that behavior difficulties are never trivial. Ill-temper, habit of failure, jealousy, rage, overdiscouragement, marked fluctuations of energy, moodiness, evasion of tasks and hard situations, "nervousness," oversensitivity, and petty delinquencies of children are danger signals which indicate that something is amiss in the interplay of the individual and his environment. It is difficult to work back to the source or beginning of many of these troubles. Recognition of etiologic factors is difficult. At this point the pediatrician is definitely and directly involved, for early recognition offers the best opportunity for correction. Parents should be reached because of their direct responsibility. They should know that the early emotional set-up is vital.

The pediatrician in private practice meets the more intelligent class of parents; those who eugenically offer the best hope for the physical and mental progress of mankind, and also parents who are best equipped to accelerate propaganda for child betterment. As an educator, his opportunities are exceptional. The scope of his teaching should extend beyond the physical attributes of his patients to include their mental and emotional natures—their total functioning. He must instruct parents in physical and mental hygiene, but he should also impress upon them the importance, to their children and to children generally, of early character building, of laying the habit and behavior foundations early in the life of the child.

Intelligent parents feel the need of a better understanding in the mental guidance of their children, but unless their physicians volunteer aid, they may seek help from non-medical sources, assuming rightly perhaps, in some instances, that their medical advisers are uninterested, too busy or incapable. Some of the agencies to whom parents appeal are capable of giving helpful service relative to the particular behavioristic abnormalities of which the elders complain, but often they do not offer all-embracing counsel. Only in

certain instances is the advice based on thorough studies of the child's physical, mental and emotional history, and of his present mental and emotional environment and training. Frequently, the child as a unit is not thoroughly appraised, and the advice often reflects the bias or the habit thought of the individual consulted and relates only to one symptom or group of symptoms.

Certain specific and constitutional diseases are decreasing, but mental aberrations are not. One might almost ask why this is so. A plausible answer is not possible here; but certainly the loss of moral and spiritual values in the home, so evident in recent years, must carry a part of the responsibility. We attempt eradication of smallpox, diphtheria and typhoid on a large scale by preventive measures. Can many of our psychiatric problems be curbed similarly? Early detection of factors that lead to mental ill health might check the ravage. Do pediatricians and other physicians pass the responsibility to others when the mantle fits perfectly on their own shoulders? Are there so few understanding parents because there are so few understanding physicians?

My plea is to urge that physicians become more conversant with the education, social, psychologic and especially psychiatric phases of child health, so that they may become worthy preceptors and consultants in the homes—family advisers for children—and that they may remain leaders in all activities directed toward the promotion of child welfare.

PRESIDENT CAMPBELL.—Since Dr. Meyer came to America and took up his work in the Middle West, he has shown continued interest in the problems of childhood, from that date until his initiation and support of this liaison work of which Dr. Kanner has brought us out a mature development. Dr. Meyer!

DR. ADOLF MEYER (Baltimore, Md.).—Considering the hour and also what we have heard this afternoon, I am not altogether certain where it would be wisest to put the emphasis. On the one hand, we have the accounts of earnest workers, some of whom I know well, and others I should like to know more of than is possible with the limited data offered in a crowded symposium. I have been particularly interested, however, in the words that we have heard last. It seems to me that it is a great misfortune that most of our colleagues who are not psychiatrists feel an obligation to make excuses for the distance that exists between us and between those who are doing particular work along the lines that the pediatrician outlined so well. Why is it? I suppose, as in every field, it is essential that the actual worker focus on the type of material that actually presents itself and which he considers inviting and perhaps difficult, but intriguing enough to devote himself to. Another avenue, of course, is that of first acquiring one or another form of methodology difficult to follow, unless one has the opportunity.

Some of us from the beginning, others later, and others, in spite of having gone through somewhat devious routes, have learned to recognize certain principles which I think every practitioner will be able to understand and which will also mean a good deal to those trained in particular methods. We

have learned definitely to value the concrete data with which we have to operate, including, of course, with the child also the situation. We are willing to develop the propinquity to the facts as they are and to see the situations.

Of course, when you hear Dr. Allen speaking of his particular rôle in connection with work, you have to take into consideration that he describes his particular share in what belongs, after all, to a full fledged organization.

When we hear the more definitely analytical and technically prepared person, we also have to reckon with the fact of the parents not being particularly drawn into the situation, in order not to spoil the analytic rapport, not betraying the child and troubling the parents with charges and criticisms levelled at them—those are points which the analyst wants to avoid in order to have his own field as little as possible contaminated by the factors which he would rather leave to the incentive or sensible attitude of the parents who immediately take a more hopeful and less interfering attitude, one of hoping that things that they misunderstood before will get better by developing a relationship that is adapted as much to the requirements of the analyst as they are to the child.

So I think there are inevitably, with either of the various types of analytic or other so-called approaches, irrespective of the particular kind a good many of those things in common that Dr. Everhart described and that the pediatricians stand by and what we might call the attitude of common sense, of progressive, interested, resourceful common sense.

The effect this symposium has had on me is this, that I find myself confronted with exceedingly interesting data and material, on the whole, on the intermediate ground between the very specialistic preoccupation and technic and accounts. These very often are given without any time statement. It is rather difficult to get from the account that tremendous importance of time and what must fill the intervals between what is mentioned in the clinical or therapeutic records. One misses, even in the very specialized accounts, the reference to points that I described a moment ago as those that come quite naturally and incidentally.

Evidently there are in the selection of methods, as in the selection of patients, in the selection of physicians, in the selection of hospitals, factors which tend towards those people being brought together that have a certain similar expectation and also similar items in which they find means of actual cooperation.

The summary accounts that I heard in the last few papers leave me somewhat baffled, because it is impossible to get in that sort of summary a feeling that one knows enough about the matter. One gets the feeling of too much hopefulness or disturbance of the hopefulness.

Nevertheless, if we could focus our discussions on material in which various participants have had a share, we might gain a great advantage. I remember, in 1916, the program of the American Association for Psychopathology made it a point to discuss a small number of patients with whom the three reporters had all had responsible contact. It was out of that I think quite a few of us learned a great deal and carried off that sense of relativity

of importance which one misses a great deal where one has accounts of one chapter and another chapter, without that actual individual contact between workers with identical or similar situations.

I must say that my discussion of such a general character has only little value as compared to what a discussion by the members of the symposium of each other's contribution would have. I, therefore, would like to express the hope that those who have offered us presentations will with their specific perspectives fall in line now and tell us freely wherein they feel their contribution was helped or challenged, with free mutual criticism of the data that we have listened to. I am sure all of us were interested, or there would not be as large an audience present at this hour to hear the end of the discussion.

Dr. Erwin Wexberg (New Orleans, La.).—I want to give my wholehearted approval to the paper of Dr. Frederick Allen, and particularly so to his criticism of what he calls the historic approach.

The only thing which counts obviously is to find out what the individual is driving at. We need understanding of the pattern difficulty of the historical development in grown up people. But in children this pattern is just being developed, it has not so much of a past; it mostly has a present. So what we have to find out in a child is the present aims and attitude, and this is easier than in adults because we can find out more from direct observation. The misleading point of view is to apply the psychology of the neurosis of grown-up people to children and to consider children as though they were adults, as though they had definite patterns which have to be found out in order to understand the actual situation.

Therefore, I wouldn't agree with any point of view which would amount to the statement that there are psychoses or neuroses or criminality in children. We have plenty of neurotic, psychotic children, but their meaning is something entirely different from what they mean in adults. It is of exceeding importance for our work to keep this distinction in mind.

Dr. James L. McCartney (Catskill, N. Y.).—During the past ten years, several thousand children have gone through the clinics in New York City. Some of those children that go through the schools of New York City have got into the state prisons. I have had the opportunity in the past six years of seeing about 6000 boys under 17 years of age, of which number 72 per cent came from New York City. It is interesting to note that of those 4000, only 8 had been in child guidance clinics. That means something, I feel, because of all the other delinquents, none had been under psychiatric care previously.

An analysis of those eight cases is rather interesting: Two were definitely schizophrenics; three were epileptics; and three were postencephalitic cases, obviously hopeless to begin with, and there was little the clinics could have done for them. Yet the actual behavior cases did not arrive in the reformatories, possibly because they received treatment earlier. The question comes up, has the work in these clinics been evaluated in relation to the state hospitals?

DR. DAVID M. LEVY (New York, N. Y.).—I want to take up Dr. Meyer's and Dr. Campbell's challenge and tell what I think of the other papers, including my own.

I should say first that the feeling of dissatisfaction that Dr. Adolf Meyer had at the end of this symposium should be partly related to the Program Committee. A number of papers were assigned to some of us in this symposium with no definite notion of integrating the field in any way. We were asked to give the papers without relation necessarily to any other papers on the program. It so happened that the papers do, by coincidence probably, integrate themselves into a certain type of response that I think at least represents the mature thought of the field today.

I think the papers that were given this afternoon could not have been given ten years ago. I see in them all a fine development of the particular stress that they place in this field.

Of the papers given, one definitely showed a particular type of development in the psychoanalytic work in children, in which the method so brutally attacked by both Dr. Allen and Dr. Wexberg was especially effective and applicable to those particular cases. Dr. Allen's paper, on the other hand, stresses a method which no one has developed to as high a degree as himself, namely, as I see it, the particular values that the child gets in therapy from the living personal relationship with the therapist, with the possibility that from that relationship the child may acquire a set of values which he can utilize in his growing relationships with others.

Dr. Plant's paper represents a mature development of an emphasis which I remember his placing for at least the past ten or twelve years, namely, on those stresses that come upon the child through the social situation; and his paper properly gave apt illustrations of the therapeutic success in those cases in which this social stress is recognized and the relief of which by an entirely different method from that of Dr. Allen or from the psychoanalytic method, was of real therapeutic effect.

The last two papers were, I think, important because we do need follow-up studies, not only to keep books on our results but more importantly to study our therapy in terms of the effect on the child. Our follow-up studies have a special value in testing our therapeutic philosophy, hence I hope to see more and more of this type of investigation.

As for my own paper, it had nothing to do with therapy, nothing to do with follow-up. It was a contribution, if you wish, to psychodynamics essentially and attempted to show that the privation of certain emotional values in the life of a child may have a distinct effect on the pathology of the child to such a degree that we can't recognize actual psychopathology in the child.

I think Dr. Wexberg's optimism that there are no neurotic, psychotic and criminal children is a very happy optimism, but quite an illusion.

DR. MARGARET W. GERARD (Chicago, Ill.).—Dr. Levy has so beautifully summarized and evaluated the various papers that I have nothing to add to this. I would, in relation to my own paper, like to clear up a few points which

I feel perhaps were misunderstood. Dr. Meyer suggests that in child analysis, the parents are eliminated. I think perhaps that is because in the discussion of the analytic material in a very short time, one does not attempt to go into the total picture which covers over a year or longer and, therefore, only the outstanding factors are discussed. But the parents are always considered, and as far as confidences not being betrayed, these confidences very frequently are given to the parents by the children themselves later in the analysis, and the parents are helped during the process in the therapeutic angle in relation to the child.

As for the research element, which I think is most valuable in analysis because of the long-time therapy which is difficult, inasmuch as one can get only the child and his attitudes, the more we know of what is actually happening within that child and are not influenced by the parents' evaluation of them, the better.

In Dr. Wexberg's reference to the historical element in child analysis, I think he perhaps confuses what happens in child analysis. Our orientation is not to what did happen but what is happening, what is the problem of the child at the present moment, how he is solving it and what is the method for better adjustment. And if historical material enters in, it comes merely as secondary to the immediate problem and the reality situation.

Dr. Frederick H. Allen (Philadelphia, Pa.).—I felt very much as Dr. Levy did about the extent and diverse nature of the program. Possibly there was a little too much on it. The main value, I think, of meetings of this kind isn't the type of presentation, but the fact that we have been getting a free give and take discussion where we can iron out some possible differences on these important subjects. As the Program Committee did write and ask us to choose our own titles so they were not in relation to what each person was going to do, but the field itself has been of a type that made it possible for many of these papers to take a certain direction because in this field as it has developed in the last decade or two, more and more we have been interested not only in the theoretical aspects of this whole problem but in the ways in which these problems are actually lived out in action and how we who are interested in the problem of therapy can really make effective whatever point of view we are applying in effecting change in the child.

I think that this program has been interesting in that it has revealed different ways of approaching these problems. But as I see the different ways and hear the discussions of them, I am convinced that they all have value. There is no one way of doing them. It certainly is true that in the application of a point of view, in applying a therapeutic process, in finding one's self in it in a very real sense, it does require a good deal of integrity, a good deal of understanding and a good deal of conviction on the part of the individual applying it, so that it does come to life through what the therapist himself can put into it in the way of his own understanding and how he can thereby help the child to a little clearer appreciation of what he can be in the continuing realities of his own life.

I was particularly interested in the material Dr. Levy presented. He has made some real contributions in this study of maternal relations to the child. I couldn't help but think of some of my own cases as he was discussing the point of affect hunger, how difficult it is with children of that type to really get any kind of working contact with them, because of the tendency to hold themselves aloof, to protect themselves from ever getting into any relationship with anyone through putting any of their own feeling into it. There are two aspects of that type of problem that to me appear important, one is the actual deprivation that the child has had in his early experiences, but possibly the more important is the fact that the child coming out of that kind of an experience finds that he can neither take affection from others nor can he give it.

The thing I am most struck with in that type of child, is that he is unable to give any of his own feeling. It is hard for him to put any of himself into the relation in order that it really can become a growing experience to him. He has become used to protecting himself from any further deprivations, from any further trauma as a result of having difficulties with people, by just surrounding and encapsulating himself in this almost affectless way that Dr. Levy has described, and he therefore finds it hard to get anything out of the work of the therapist, because the latter is measured not so much by what the therapist puts into it, as by what he can stimulate the child to put into it of himself, to find what qualities are his and what he can really live with as a part of himself.

Dr. Leo Kanner (Baltimore, Md.).—There is just one thing I want to say. I have heard so much today the word "approach." I have heard of the psychoanalytic approach, Dr. Allen spoke of the approach, Dr. Wexburg mentioned the word approach, and I have been wondering to just what extent it goes, if it doesn't really show something more than a word, whether it doesn't have more connotation than just the use of the word. The thing that it implies is that we are here with something, with an armamentarium, with some tools ready to approach the patient who comes to us. I think that the word "approach" is justified all right, but perhaps with another, a different connotation, and that is we are *being* approached; we don't approach the patient. There is a patient and a situation that approach us. It is not only the parents who approach us; with every patient there come a child, a home situation, a community situation, with many aspects, some of which possibly are difficulties of the child and others which puzzle the parents, sometimes the teachers in school, some of which puzzle the juvenile court judge, and in my case many of them puzzle the pediatrician who sends the child. They are approaching us with problems of one or the other or problems of several of these groups, and we must deal with the facts that we see before us. In so doing we are entitled to take a breath every once in a while to see what we are dealing with and how these things group themselves, but I would suggest to myself (I always do) that in taking that breath one doesn't need to hyperventilate because of the possible results.

MENTAL CHANGES INCLUDING APHASIA IN A PATIENT WITH SICKLE CELL ANEMIA.

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The occurrence of mental symptoms or particularly of aphasia in a patient with sickle cell anemia has not, to our knowledge, been reported. Kampmeier [1] recently described repeated attacks of neurologic disturbance, including hemiplegia, in a patient with this disease, and refers to reports [2] of four other similar cases. Kampmeier's patient and one of the others had blood in the spinal fluid. Another patient showed postmortem evidence of subarachnoid hemorrhage with cerebral softening; necropsy of another revealed recent diapedesis of red cells into the meninges, a small area of cerebral softening and small petechiæ in some of the nerve trunks. Our investigation indicates that there is only one case on record at Cook County Hospital of pathologic changes in the central nervous system found postmortem in a patient with sickle cell anemia. These changes consisted of chronic leptomeningitis and occasional recent perivascular extravasation of blood in the basal ganglia. Steinberg [3] in 1930 reviewed all of the necropsy reports, a total of 16, of patients with sickle cell anemia. No pathologic changes in the nervous system were observed in any of these examinations.

Report of a Case.

W. C., a negro boy of 13, was admitted to the Research and Educational Hospital, November 5, 1936, because of mental symptoms. The boy had been

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[1] Kampmeier, R. H.: Sickle cell anemia as a cause of cerebral vascular disease. Arch. Neur. Psy., 36: 1324 (Dec.) 1936.

[2] Cook, W. C.: A case of sickle cell anemia with assoc. subar. hem. J. Med., 11: 541 (Dec.) 1930.

Arena, J. M.: Vascular accident. Hemiplegia in a patient with sickle cell anemia. Am. J. Dis. Child., 49: 722 (Mar.) 1935.

Yates, W. M., and Hansman, G. H.: Sickle cell anemia: A new cause of cor pulmonale. Am. S. M. Sc., 191: 474 (Apr.) 1936.

[3] Steinberg, B.: Sickle Cell Anemia. Arch. Path., 9: 876 (Apr.) 1930.

subject to recurrent attacks of weakness and tachycardia, sometimes associated with slight fever and with pericardial pain, since infancy. In 1929 he had first been seen at the Research and Educational Hospital where a diagnosis of sickle cell anemia was made. In 1930 a splenectomy was performed. Following the operation he was kept under observation by Dr. Poncher of the Pediatrics Department. The boy continued to have symptoms of weakness and tachycardia following exertion but otherwise got along well. He attended school half-days. School reports indicate that his grades were average during 1935-36, and poor during the fall of 1936. No speech disturbances were noticed. In October, 1936, the boy's mother observed that he omitted words when reading and did not seem to understand corrections. During the following week it was noticed that he mispronounced words, no longer observed his former routines and expressed no interest in them. He spoke in a loud voice, did not respond when addressed, and on occasions seemed not to recognize members of his family. On the hospital ward he at first was restless and made irrelevant responses when addressed. He was examined by us first on November 11, and subsequently on six occasions, the last examination being on May 11, 1937. He was given on each occasion a set of simple verbal questions and directions, as, "What is your name?" "Write your brother's name." His responses at first were only 18 per cent direct and relevant. Most of his irrelevant responses were in the form of stereotyped phrases, as, "Wendell" and "I want to see my father." Sometimes he said, "What?" and "Huh?" His written responses were not noticeably different in quality from the spoken responses. The same set of questions and directions were then written, and his responses from the first were 100 per cent correct (Table 1). Tests for identification of such familiar objects as comb, pen, envelope, revealed the fact that at first he could not name any of these objects, though he showed an ability to use them correctly. When the names of the objects were written, he picked them all out correctly. His ability to name objects gradually improved, so that by January, 1937, he named correctly 50 per cent of objects presented, and gave garbled names to the other 50 per cent. No further improvement has taken place since January. During the patient's stay on the ward he became less confused, gradually cooperated better in ward activities and showed increasing interest in those around him. The mother states that the boy shows persistent changes in personality, particularly increased irritability and restlessness, a preference for infantile games, and a tendency to make grandiose statements. The results of a Stanford-Binet test given in February, 1937, indicated an I. Q. of 50. A drawing made at the same time scored according to Goodenough indicated an I. Q. of 75.

Comment.

Weisenburg's [4] studies of aphasia indicate that in the great majority of patients with this symptom, there is a lesion involving the

[4] Weisenburg, T. H., and McBride, K. E.: Aphasia, a clinical and psychological study. Commonwealth Fund, 1936.

TABLE 1.

	First exams., 11-11 & 11-17-36.	Second exams., 11-24 & 11-27-36.	Third exam., 1-26-37.	Fourth exam., 5-14-37.
Comprehension of verbal questions and directions..	(27 instances)	(24 instances)	(20 instances)	(30 instances)
Response direct and relevant.....	18%	42%	95%	100%
Response partial or delayed correct.....	15%	16%	0	0
Response irrelevant	66%	42%	5%	0
Comprehension of written questions and directions..	(12 instances)			
Response direct and relevant.....	100%	....	....	....
Identification of objects by sight.				
Response indicating recognition of use.....	100%	100%	....	....
Response indicating ability to name.....	(8 instances)	(19 instances)	(22 instances)	(20 instances)
Correct name	0	31.5%	50%	60%
Garbled name	0	31.5%	50%	40%
Failure	100%	37 %	0	0

dominant hemisphere of the brain. As this patient was right handed, it is probable that his left hemisphere is involved. The changes in personality resemble those described in known frontal lobe lesions, and the predominance of the auditory receptive defects suggests temporal lobe involvement. The only nervous system changes so far reported in this disease are those associated with hemorrhage, and the patient's symptoms suggest the likelihood of multiple petechial hemorrhages into the brain. The mechanism of such hemorrhages in sickle cell anemia is unknown, and the subject requires further study.

Summary.

The case is reported of a colored boy, aged 13, with sickle cell anemia who suddenly developed mental changes including aphasia. The occurrence of multiple small cerebral hemorrhages is suggested as the most likely cause of the symptoms.

Comment.

THE PROBLEM OF THE SEX OFFENDER.

There has been much public agitation of late owing to a series of sex offenses against children, often including murder, in metropolitan centres, raising the question whether such offenses are on the increase. Serious consideration is being given to legislative and other measures for dealing with this evil in which it is commonly accepted that psychiatry may have something worth while to say.

In order to take stock of the situation in a careful and dispassionate way the National Committee for Mental Hygiene at its twenty-eighth annual meeting at the Hotel Roosevelt, New York City, November 10, held a symposium on "The Challenge of Sex Offenders," to which contributed leaders in psychiatry and criminology.

Dr. Edward A. Strecker, professor of psychiatry at the University of Pennsylvania, presided over the symposium and opened the discussion with the statement that the press had overemphasized the present "wave" of sex crime. "It is doubtful," he said, "that there is an actual increase in the number of these sex offenses. Indeed, it seems likely that at certain times in history they were more prevalent. There is no place for sickly sentimentality in dealing with this problem, but the line of demarcation between normal and abnormal sexual manifestations is often quite faint and abnormal sexuality has its representation in miniature in normal sex life. It is the duty of the law to protect the public. It must continue to do that. But over and above this there should be an effort in the direction of better understanding. Prejudice and intolerance should not be permitted to becloud constructive judgment."

The Hon. Austin H. MacCormick, Commissioner of Correction of New York City, in describing "New York's Present Problem" also expressed the opinion that there has not been a serious increase in sex crimes. He stated however: "Frankly, I do not know whether sex offenses are on the increase or decrease in this city and I doubt that anyone does. It is my own opinion that there has

been very little change in either direction in the last few years, but there are no adequate statistics with which to prove or disprove that statement. Thousands of sex offenses of one sort or another are committed every year without ever coming to the attention of the police or getting into the statistical records. Victims of or witnesses to sex offenses are reluctant to report the matter or to testify if an arrest is made. For this reason, and also because so many complainants and witnesses are children whose evidence is unreliable and easy to controvert, the percentage of convictions in sex offenses is not high. In 1936 in New York City, 277 arrests for indecent exposure resulted in 150 convictions and in 66 persons being imprisoned or sent to a hospital for the insane. Four arrests for rape of children between the ages of 7 and 12 resulted in 2 convictions, 20 arrests for rape of children from 12 to 14 years of age resulted in only one conviction, and 772 cases of rape of girls between 14 and 18 years of age resulted in 183 convictions. One hundred and seventy-five arrests for sodomy resulted in 61 convictions and in 45 persons being imprisoned or sent to mental hospitals. Three hundred and thirty-eight arrests on the charge of impairing or endangering morals of children resulted in 145 convictions and in 89 persons being imprisoned or sent to hospitals."

Commissioner MacCormick stated that the ideal method of handling the problem would be to put all cases under observation in a hospital well-staffed with competent psychiatrists and to secure a psychiatric diagnosis, at least, before the case is settled in court. "We do this," he said, "in cases coming before the Court of General Sessions but the city lacks the facilities for doing it with all the cases which the Court of Special Sessions and the Magistrates' Courts must handle. It is certain that there is not room enough at Bellevue or in any other New York City hospital for all those who should go there and remain long enough to insure an adequate diagnosis."

In concluding, Commissioner MacCormick said: "Until the attitude of the people as a whole towards sex is more rational, until it can be discussed more frankly and more intelligently, until people realize more fully what damage repressions and complexes and maladjustments can do to a normal mind, and until we approach the problem with sustained intelligence rather than in bursts of occasional hysteria, we must expect sex offenses to constitute a major problem for society."

Dr. Karl M. Bowman, director of the psychiatric division, Bellevue Hospital, New York City, spoke on "Psychiatric Aspects of the Problem." He pointed out that one of the difficulties is to come to any fundamental agreement as to what constitutes normal sex behavior, citing instances of conflicting concepts in different cultures and even within our own culture. The practice of birth control offers an example of "a particular type of sex behavior which is considered abnormal and perverse by one group and normal and natural by another."

"Our cultural attitude toward sex is generally one of extreme repression," he continued, "and towards no other instinct or drive of the personality are such extreme repressions and control maintained. This being the case, we find that unstable persons very frequently have great difficulty in adjusting to the conventional demands of society concerning sex behavior. Every psychiatrist is familiar with the fact that in practically all neurotic individuals there exists a deep-rooted sexual problem. The other half of the story, however, is that in most normal persons there is a deep-rooted sexual problem, but that the individual is able to carry on in spite of this. We do not find that the neurotic necessarily has any greater sex problem than the normal individual. Often he is merely unable to adapt himself so well to the stresses and strains imposed by such a problem. While helping to solve his sex problem may help him to get into a more normal condition, it is not fair to attach the whole responsibility for the break-down to the sex problem."

Dr. Bowman stated that the feebleminded as a group are no more likely to commit sex offenses than persons of normal or superior intelligence. However, he added, society has accepted the idea of permanent segregation for feebleminded sex criminals but it still lacks any method of dealing adequately with those of normal or superior intelligence. He also stated that definite psychoses account for only a small group of sex crimes.

"We can mention specifically," he said, "personality changes following epidemic encephalitis, in which there is often increased sex drive and lack of inhibition; certain epileptic furors and confused states with violent sexual assaults; a general increase in sex drives with a lack of inhibition in manic excitements; certain bizarre and peculiar sex crimes in schizophrenia; and certain crude sex assaults in general paresis and other organic brain diseases."

He stated that the majority of revolting sex crimes are committed by persons who are not legally insane, and who could not have been committed to mental hospitals if they had been seen shortly before such crimes occurred.

" If we try to understand the causes of sexual maladjustments," Dr. Bowman said, " we find they depend on three things—the constitutional make-up of the individual, both physical and mental, the culture in which he lives, and special conditioning experiences which may produce special attitudes and sensitivities."

He closed by stating that no simple solution to the problem is to be expected. " Simply passing more laws or making penalties more severe will not solve the problem. The public is demanding some simple, easy formula for dealing with this problem. No such formula exists. The problem is exceedingly complicated. More study and research are needed. The methods of psychiatry offer the best opportunities of studying and acquiring further knowledge in this field."

Dr. Winfred Overholser of Washington, D. C., contributed the closing discussion in this symposium, his subject being " Legal and Administrative Problems in Dealing with Sex Offenders." He commented upon the public furors which accompany the socalled crime waves and deplored the demand for new and stringent laws which occurs periodically. " The enactment of laws relating to offenders is rather commonly conditioned emotionally," Dr. Overholser said, " rather than by a cold study of the needs of the situation, and when emotional excitement cools off laws which have been enacted under its pressure fall into disuse and become rusty. Another wave of excitement comes along and further cogs are added to the machinery, so that it is indeed small wonder that the whole jumble of gears fails to function efficiently."

Dr. Overholser stated that except perhaps in two jurisdictions in this country the right of the court to have mental examination made upon defendants is undoubted and in at least the larger cities the necessary personnel is available.

" It remains, therefore," he said, " in many cases for the judge to be impressed with the desirability of knowing something concerning the human material with which he is dealing. I speak particularly of sex offenders, although the same principles hold with regard to many other types of transgressors. The New York City Court of

General Sessions is perhaps the only court of general jurisdiction in the country which has before it a psychiatric report in all felony cases before disposition. Such a principle is unquestionably sound, and it is interesting to note that in 1929 the American Bar Association adopted resolutions advocating likewise a psychiatric examination before parole. In spite of the fact that this association of lawyers went on record in this progressive manner the procedure is still by far the exception rather than the rule.

" The desirability of a routine examination as against an examination only of defendants in whose cases the defence of insanity is pleaded, should not call for extended comment. . . . . The Briggs Law of Massachusetts embodies this principle of routine examination, providing for it before trial. This is ideally the time in which such examination should be made, since in no inconsiderable number of cases the expense of a trial has been saved by the recognition of mental disease in the defendant. Here is a law which has been in successful operation and which has over and over demonstrated its value for a period of 16 years; yet such is the tendency of the legal mind to shy at anything strange that when a similar provision was incorporated in a model testimony bill drafted by Dean Harno, of the University of Illinois, and submitted to the Commissioners on Uniform State Laws, it was omitted from the bill finally recommended by the Commissioners as being too revolutionary. This example illustrates the tremendous power of inertia which must be overcome if a more rational and scientific manner of dealing with offenders is to be brought into effect."

Dr. Overholser pointed out that another difficulty in dealing with the mentally pathological offender is that, although in a considerable number of cases psychiatrists would agree that a defendant is mentally abnormal, his abnormality is not of such a degree or kind as to be recognized by the law as calling for specialized treatment. The laws of the several states, he explained, are in general agreement in providing for the segregation in special institutions of those offenders denominated as " insane " and two states, namely, New York and Massachusetts, have special provisions for the truly indeterminate commitment of the so-called defective delinquent.

" However, no state in this country," he said, " and only one or two European countries, have special provisions relating to the

offender suffering from what is generally known as psychopathic personality. It is this group which constitutes a considerable proportion of the so-called sex offenders and which not unlikely makes up a fair percentage of the total criminal population. It seems safe to say that before the law can be expected to recognize this group as calling for specialized treatment it will be necessary for the psychiatrists to come to a better agreement on the delimitation of the group. The statistics which have been published by psychiatric clinics in courts and correctional institutions show such a wide discrepancy that it seems likely that the basal difficulty is in the criteria of diagnosis."

Dr. Overholser stated that in too many instances the so-called indeterminate sentence is such only in name and usually has a rather short upper limit in practice, so that while the public believes the offender will be confined for a long time he is often set at liberty within two or three years.

"Judges should be given even wider latitude than they now have," he said, "relative to the length of the period of confinement to be imposed and they should be governed to a considerable extent in their disposition by official psychiatric reports relative to the offender's mental state."

Parole boards, too, he said, instead of concerning themselves primarily with such statistical details as the proportion of sentence served, might do well if they paid more attention to the mental make-up of the convict whose parole is being considered.

It would hardly be expected that a colloquium such as this could reach any definite conclusions or formulate practical measures which might speedily be put into effect. The symposium served at least two purposes: it brought to light some of the popular misunderstandings relating to antisocial sex behavior; and it exposed the difficulties of dealing with such phenomena, owing partly to lack of agreement in definition and partly to actual lack of data concerning many aspects of the problem.

The significance of sex in both normal and abnormal mental states has been so much labored in recent years that it is hardly necessary to stress this fact. Notwithstanding the paramount rôle of the sex function in health and disease it remains true that in medical education it is altogether inadequately dealt with and too often neglected entirely. The result is that medical students become

practitioners of medicine with little knowledge in this field which goes beyond anatomical structure and tissue pathology.

Sex crimes such as readers of the daily papers are all too familiar with, and which will always have to be reckoned with, do bring home with emphasis the fact that organized investigation in this domain has been lacking and is still lacking. In large part it is probably the old story of avoidance of what has been traditionally regarded as unseemly and distasteful, if not unmentionable—an artifact of our one-sided culture.

Fundamental studies are needed in which biology, psychology and psychopathology, sociology and criminology must collaborate. A special division of a well appointed and well manned psychiatric clinic would probably be the place where such studies could best be carried on. In the study of the individual sex offender as in that of a psychotic patient the determination of suitable disposal usually offers no great difficulty; the difficulty resides in providing the means of doing the thing which should be done. It would be through the accumulation of data from continued studies such as herein contemplated that society might learn what measures may be best in dealing with sex offenders, what may become possible in the way of prevention and what enabling legislation may be required.

News and Notes.

GRADUATE COURSE IN PSYCHIATRIC NURSING.—The New York State Department of Mental Hygiene offers to qualified graduate nurses a course of eight months in psychiatric nursing at the New York State Psychiatric Institute and Hospital, New York City. Nurses who have had three or four months affiliation are given preference in enrolment. The class will be admitted February 1, 1938. Board and laundry service are provided during the course.

For further information address Dr. Nolan D. C. Lewis, director, New York State Psychiatric Institute and Hospital, 722 West 168th Street, New York City.

SOUTHERN PSYCHIATRIC ASSOCIATION.—The third annual meeting of the Southern Psychiatric Association was held in San Antonio, Texas, October 8 and 9, 1937, with more than two hundred and fifty physicians from all parts of the South in attendance.

The meeting, which was by far the most successful held yet by this organization, is a striking indication of the healthy growth of interest and activity in the field of psychiatry in the South. In addition to the several hundred physicians registered, many local physicians, social workers and nurses were present at the various sessions.

Dr. Newdigate M. Owensby of Atlanta, Georgia, one of the founders of the Association, and at present secretary-treasurer, reported an unusually heavy increase in applications for membership during the past year, and stated further, that the quota for fellows had already been filled.

Following opening formalities and the address of the president, Dr. William D. Partlow of Tuscaloosa, Alabama, on the morning of October 8, scientific sessions were held during the afternoon and during the morning and afternoon sessions, October 9.

Contributors to the scientific program were: Dr. George T. Harding, Columbus, Ohio, "The Periodicity of the Manic Depressive Psychoses"; Dr. Giles W. Day, Galveston, Texas, "Discus-

sion of Newer Methods of Psychiatric Treatment"; Dr. W. C. McConnell, St. Petersburg, Florida, "Endocrinology in Psychiatry"; Dr. Guy F. Witt, Dallas, Texas, "Mental Disturbance Due to Bromide Intoxication"; Dr. James A. Willie, Houston, Texas, "The Analysis of a Case of Hysteria"; Dr. Isham Kimball, Lexington, Ky., "The Necessity for Comparative Study of Schizophrenia and Organic Reaction Types of Psychoses"; Dr. Walter J. Otis, New Orleans, Alabama, "Childhood's Early Symptoms of Mental Hygiene Problems"; Dr. D. Henry Poer, Atlanta, Georgia, "Psychoses Due to Thyroid Disorders"; Dr. George Rudolph Herrman, Galveston, Texas, "Neuro-Cardiac and Neuro-Circulatory Disorders"; Dr. W. B. Russ, San Antonio, Texas, "Psychoses Complicating Surgical Cases"; Dr. Newdigate M. Owensby, Atlanta, Georgia, "Sanity in Psychiatry." Guest speakers were: Dr. Philip Smith, New York, "Psychiatric Work in New York Institutions", and Dr. C. C. Burlingame, Hartford, Conn., "Can the Point of View and Technique of Private Practice be Carried into the Mental Hospital?"

Officers elected for the coming year are: Dr. George P. Sprague, Lexington, Ky., president; Dr. Charles S. Holbrook, clinical professor of psychiatry, Tulane University, president-elect; Dr. Newdigate M. Owensby, Atlanta, Georgia, re-elected secretary and treasurer; Dr. H. W. Priddy, Memphis, Tenn., vice-president; Dr. T. M. Dorbandt, San Antonio, Texas, and Dr. W. D. Partlow, Tuscaloosa, Alabama, councillors.

The next meeting of the Association will be held in Atlanta, Georgia.

KENTUCKY PSYCHIATRIC ASSOCIATION.—On May 5, 1937, a group of psychiatrists practicing in the State of Kentucky met in Lexington for the purpose of organizing a psychiatric association. As a result of this meeting, the Kentucky Psychiatric Association was formed with the following stated objectives: "to further the study of subjects pertaining to the nature, treatment and prevention of nervous and mental disorders; to further the interests, the maintenance and advancement of standards of hospitals for nervous and mental disorders, or outpatient clinics, and of all other agencies concerned with the medical, social and legal aspects of these disorders; to further psychiatric education and research; and

to apply psychiatric knowledge to other branches of medicine, to other sciences and to the public welfare of the citizens of the State of Kentucky."

Two classes of membership are provided: "Members and Honorary Members. Members shall be residents of the State of Kentucky at the time of their election and Honorary Members shall be residents of the United States or its dependencies."

Officers were elected for the year 1937-38, and are as follows:

President: Isham Kimbell, M. D., Lexington.
Vice-President: Spafford Ackerly, M. D., Louisville.
Secretary-Treasurer: Robert H. Felix, M. D., Lexington.
Councillors:
Lawrence Kolb, M. D., Lexington, for 4 years.
W. E. Gardner, M. D., Louisville, for 3 years.
L. E. Trent, M. D., Lexington, for 2 years.
L. M. Rogers, M. D., Lexington, for 1 year.

The first annual meeting will be held in Louisville January 8, 1938.

Dr. Jung Gives Terry Lectures at Yale.—Carl Gustav Jung, M. D., LL. D., professor of analytic psychology, Federal Polytechnical University, Zurich, Switzerland, gave the Dwight H. Terry Lectures at Yale University, October 20, 21, and 22, 1937. President Seymour introduced Dr. Jung who spoke before very large and appreciative audiences. The subject of his lectures was "Applied Psychology and Religion."

The Dwight H. Terry Lectureship Fund, established in 1905 by gift from Dwight H. Terry of Plymouth, Conn., became available in 1923 for lectures on "Religion in the Light of Science and Philosophy."

Dr. Jung's lectures will be published in book form by the Yale University Press, and a review of this volume will appear later in the Journal.

Diplomates of the American Board of Psychiatry and Neurology, Inc. (Diplomates certified June 2, 1937.)—Certified on record (Class I):

NEUROLOGY AND PSYCHIATRY.

Bluemel, Charles Sidney	Denver, Colo.
Bogen, Eugene Feilen	Danville, Ill.
Edler, William	Pasadena, Calif.
Haviland, Walter C	Middletown, Conn.
Heldt, Thomas J	Detroit, Mich.
Johns, George Alexander	Owings Mills, Md.
Karnosh, Louis J	Cleveland, Ohio
Lewy, Fritz H	Philadelphia, Pa.
McKinney, John McDowell	New York, N. Y.
O'Donnell, John J	Erie, Pa.
Reed, Elias Alfred	Brooklyn, N. Y.
Reye, Henry A	Detroit, Mich.
Richardson, William Waddle	Mercer, Pa.
Smith, Henry Mason	Tampa, Fla.
Solomon, Meyer	Chicago, Ill.
Stone, Theodore T	Chicago, Ill.
Thompson, Charles William	Pasadena, Calif.
Williams, Charles Frederick	Columbia, S. C.
Wilson, David C	University, Va.
Woods, Andrew Henry	Iowa City, Iowa
Work, Philip	Denver, Colo.
Yaskin, Joseph C	Philadelphia, Pa.

PSYCHIATRY.

Barnes, Frank Haslehurst	Stamford, Conn.
Bond, Earl Danford	Philadelphia, Pa.
Boone, James E	Columbia, S. C.
Brady, Emory John	Colorado Springs, Colo.
Bunker, Sidney Moore	Westwood, Mass.
Chapman, Ross McClure	Towson, Md.
Doolittle, Russell Comber	Des Moines, Iowa.
Greenacre, Phyllis	New York, N. Y.
Hamilin, Percy Gatling	Newport News, Va.
Klopp, Henry I	Allentown, Pa.
McCord, Clinton Preston	Albany, N. Y.
Menninger, Karl A	Topeka, Kansas
Oberndorf, Clarence Paul	New York, N. Y.
Ordway, Mabel D	Boston, Mass.
Read, Charles F	Elgin, Ill.
Slocum, Clarence Jonathan	New York, N. Y.

NEUROLOGY.

Currier, Fred Plumer.....Grand Rapids, Mich.
Lennox, William Gordon.....Boston, Mass.
MacRobert, Russell Galbraith.....New York, N. Y.
Spiegel, Ernest .....Philadelphia, Pa.

Certified after examination (Classes II and III):

NEUROLOGY AND PSYCHIATRY.

Appel, Kenneth Ellmaker.....Philadelphia, Pa.
Berk, Arthur .....Boston, Mass.
Bromberg, Walter .....New York, N. Y.
Cozby, Harold Otis.....Chelsea, Mass.
Draper, Paul A.....Colorado Springs, Colo.
Fay, Temple .....Philadelphia, Pa.
Fox, James Charles, Jr.....New Haven, Conn.
Hoedemaker, Edward David.....Seattle, Wash.
Impastato, David J.....New York, N. Y.
Low, Abraham Adolf.....Chicago, Ill.
Matthews, Robert Archibald.....Philadelphia, Pa.
Nichols, John Hatcher.....Cleveland, Ohio
Nielsen, Johannes Maagaard.....Los Angeles, Calif.
Salmon, Leon Arthur.....New York, N. Y.
Slattery, John J.....Harding, Mass.
Sprague, George S.....White Plains, N. Y.
Tartakoff, Samuel .....Boston, Mass.

PSYCHIATRY.

Allen, Frederick H.....Philadelphia, Pa.
Binzley, Richard Francis.....Brentwood, L. I., N. Y.
Blain, Daniel .....New York, N. Y.
Brussel, James Arnold.....Brentwood, L. I., N. Y.
Chambers, Noble R.....Syracuse, N. Y.
Cohen, Benjamin .....North Grafton, Mass.
Cohen, Roger .....Washington, D. C.
Cooper, Olive Alfreda.....Boston, Mass.
Corrin, Kenneth Matthew.....Wernersville, Pa.
Davidoff, Eugene .....Syracuse, N. Y.
Dunbar, Helen Flanders.....New York, N. Y.
English, Oliver Spurgeon.....Philadelphia, Pa.
Fleming, Robert Edward.....Boston, Mass.
Flower, Bardwell Hastings.....North Grafton, Mass.
Gaebler, William Charles.....Foxboro, Mass.
Hernandez, Rafael (previously certified in Neurology) .....Nashville, Tenn.

Palmer, Harold D.	Philadelphia, Pa.
Paul, Francis	Green Farms, Conn.
Randall, Guy Charles	Northampton, Mass.
Rosenzweig, Leonard	Warren, Pa.
Saul, Leon Joseph	Chicago, Ill.
Sleeper, Francis Harper	Worcester, Mass.
Smith, Lauren Howe	Philadelphia, Pa.
Washburne, Annette Clarke	Madison, Wisc.
White, Paul L.	Dallas, Texas.
Whitehorn, John C.	Waverly, Mass.
Woodall, Charles Simpson	Waverly, Mass.

NEUROLOGY.

Brown, Madelaine Ray	Boston, Mass.

DR. JOSEPH E. BARRETT TO DIRECT MICHIGAN STATE HOSPITAL COMMISSION.—Dr. Joseph E. Barrett of Taunton, Massachusetts, has been appointed director of the State Hospital Commission of Michigan by Governor Frank Murphy and the newly created Commission. The State of Michigan has adopted recently important and progressive legislation dealing with the care of the mentally ill, embodying a broad mental hygiene program and creating a central State Hospital Commission with a director as chairman.

Almost three decades ago Michigan gave her native son to Massachusetts, the late Dr. George M. Kline, who organized a Department of Mental Diseases and developed a state hospital system in Massachusetts which served as a model both in America and abroad. Dr. Barrett is uniquely qualified to consummate this reciprocal exchange with the State of Michigan because he has been trained in departmental organization and hospital management under the late Dr. Kline and under subsequent commissioners in Massachusetts including Dr. James V. May and Dr. Winfred Overholser.

Dr. Barrett was born in Jonesboro, Arkansas, April 24, 1891, and was educated in the public schools of that city and in the state university. He graduated from the University of Tennessee, School of Medicine, in 1922, and served a rotating internship at the St. Louis General Hospital. He was assistant physician at the State Hospital for Nervous Diseases, Little Rock, Arkansas, from 1923 to 1928. He was appointed assistant superintendent of the Taunton State Hospital, Taunton, Massachusetts, in 1928, was promoted to

assistant to the commissioner in the Massachusetts Department of Mental Diseases in 1931 and again promoted to assistant commissioner in 1934. He resigned from the state service June 1, 1937, since which time he has been engaged by the National Committee for Mental Hygiene in making surveys of state hospitals in Iowa and Virginia. He is a member of the Bristol County and Massachusetts Medical Societies, fellow of the American Medical Association and The American Psychiatric Association, member of the New England Society of Psychiatry, the Massachusetts Psychiatric Society, the National Committee for Mental Hygiene, and a diplomate of the American Board of Psychiatry and Neurology.

Dr. Barrett's resignation as assistant commissioner in the Massachusetts Department of Mental Diseases last June was subsequent to the replacement of Dr. Overholser as commissioner, and represents a further loss in psychiatric leadership which Massachusetts can ill afford to sustain.

SECOND INTERNATIONAL CONGRESS ON MENTAL HYGIENE.—The Second International Congress on Mental Hygiene was held at the Maison de la Chimie, Paris, opening on Monday, July 19 and concluding its program of papers on Friday, July 23.

On Saturday, the members of the Congress were taken to the main psychological laboratory of the French Railways, and later on the same day to one of the state institutions for feebleminded, ending up on that afternoon with a visit to Versailles. On Sunday, July 25, a dinner for the delegates to the Congress was held and a meeting of the International Committee for Mental Hygiene, at which meeting it was recommended that the Third International Congress should be held in 1940 in Rio de Janeiro.

On the first day of the Congress there were approximately 260 members and guests in attendance and about the same number were present on nearly all the days of the Congress. Forty countries sent representatives, and a preprinting of the papers or abstracts of the papers permitted the official delegates to have in their hands on the day of a particular meeting the papers to be presented that day with their translation. The auditorium of the Maison de la Chimie, where the meetings were held, was ample in size for the

meetings, which were all held in the auditorium of this building. One feature proved disadvantageous to the members in attendance: each paper, immediately after its presentation, was abstracted by an interpreter and given in the two other official languages of the Congress—for example, if a paper was given in German it was then abstracted in French and in English. This necessitated, for those who remained through all the sessions, the hearing of each paper, at least in abbreviated form, twice after having heard it read in full in its original language. Although the building was provided with head phones and dials so that two translators on the platform could immediately give the papers in the other official languages, these were not in use until the succeeding week at the First International Congress on Child Psychiatry. Undoubtedly, this was for reasons of economy, as when used at the Congress on Child Psychiatry, it enabled the delegates to put on the head phones, turn the dial to the language in which they wished to hear the paper, and in that way each paper was given only once, which served to expedite the program and avoid fatigue for those listening.

The opening session of the Congress had the usual addresses by the Minister of Health of France and by Dr. Edouard Toulouse, President of the Second International Congress on Mental Hygiene; also the report of Mr. Clifford W. Beers, Secretary General of the International Committee for Mental Hygiene, and a report by Dr. Georges Genil-Perrin, Secretary General of the Second International Congress on Mental Hygiene. Doctor Toulouse in his address paid a very splendid tribute to Mr. Beers as the founder of the work in mental hygiene.

In the opening session the last paper was given by Dr. André Repond of Switzerland, entitled the "Scientific Bases of Mental Hygiene." This was one of the most stimulating papers of the whole session and stressed the need for an attempt to obtain the factual data relating to problems of mental health, and to constantly strive through scientific studies to develop an adequate preventive program. On each day the morning program was usually given to three papers, each one having someone assigned for discussion of the paper. The length of the programs in general did not allow for much other discussion from the floor and there were many in attendance at the Congress, who, if time had permitted, could have made distinct contributions to the discussion. Each afternoon program

was given over to short five minute communications which were presented but no time was allowed for discussion of these communications.

The first day of the Congress, the general subject for the papers was Genetics and among those presenting papers on that day were Professor Rüdin of Munich and Dr. J. M. Sacristan of Madrid. The paper of Dr. Howard C. Taylor of New York was read in his absence by Dr. Adolf Meyer and was discussed by Professor Pohlisch of Bohn, Germany.

The second day of the Congress was given over to Mental Hygiene and Education.

One of the best papers in this series was given by Dr. Dorrado Tumiati of Florence, Italy, on "Mental Hygiene in the Education of the Family." One of the most interesting communications presented on this day was by Dr. Ruth E. Fairbank of Baltimore, taking up the problem of epidemiology of the mental hygiene problems presented in the year 1933 in a district of Baltimore, Maryland.

On the third day the morning program was devoted to a miscellaneous group of papers and communications dealing with heredity and constitution and special studies, both in prevention and treatment, of mental disease. One of the most interesting papers that day was by Professor Kretschmer of Marburg, Germany, dealing with the rôle of heredity and constitution in the etiology of mental disorders. In the afternoon the topics presented were the toxic disorders and some of the mental health problems in relation to suicide. Professor Walter R. Miles, of the Institute of Human Relations, Yale University, gave a very excellent paper discussing the Prophylaxis of Alcohol very completely; and Professor D. K. Henderson of Edinburgh presented an excellent paper on Individual and Social Prophylaxis regarding Suicide.

On the morning of the fourth day the program concerned itself with the organization of mental health facilities. The mental hygiene organizations in various communities and states were discussed and much interesting material was presented.

In the afternoon medico-legal problems concerning the psychopath and the criminal were presented.

On the fifth day the session was devoted to problems of statistics, classification and public education. Sir Hubert Bond pre-

sented a paper making a plea for international classification of mental troubles, bringing up the whole problem of nomenclature. This paper was discussed by Dr. Horatio M. Pollock of the Mental Hygiene Department of New York State.

Following the afternoon session on several of the days, visits to the psychological laboratory of the Paris Street Railway System were arranged and visits to several of the institutions near Paris for the care of the mentally sick and mentally deficient.

A series of social entertainments were provided, starting on the first of the week with a reception at the Minister of Foreign Affairs, and concluding with a reception given at the Hotel de Ville for the delegates to this Congress and those attending the Psychologic Congress which started its session at this time, as well as those who came for the First International Congress on Child Psychiatry.

As is common with all large Congresses, the opportunity to meet leaders in their respective fields throughout the world was a special privilege. Frequently divergent views were presented but usually in the discussion a common ground was found for our future method of procedure, and in the opinion of the writer this Congress did much toward clarifying our thinking on many important problems relating to mental health, strengthened materially the organization working toward this and brought together for earnest personal discussion many who are contributing greatly to the advancement of this comparatively young branch of preventive medicine.

The American delegation welcomed the presence of the Dean of American Psychiatry—Dr. Adolf Meyer, who attended every session and presided over one of them.

The Secretary of the Congress, Dr. René Charpentier, accomplished almost single handed in this Congress the problems of organization and the preparation of the programs, and deserves highest credit for his work, as well as do many others who contributed both in time and effort toward the success of the Congress.

A. H. R.

AMERICAN PUBLIC HEALTH ASSOCIATION MEETING, 1938.—The officers of the American Public Health Association announce that the 67th annual meeting will be held in Kansas City, Mo., October 25-28, 1938.

Dr. Edwin Henry Schorer, director of the Kansas City Health Department, has been appointed chairman of the local committee. He will be assisted by a large group of city and state officials and community leaders.

A long list of affiliated organizations meet habitually with the American Public Health Association. They include:

The American Association of School Physicians.
The Association of Women in Public Health.
The Conference of State Laboratory Directors.
The Conference of State Sanitary Engineers.
The American Association of State Registration Executives.
Delta Omega.
The International Society of Medical Health Officers.

The attendance at the 67th annual meeting will exceed 3000 professional public health workers from every state in the Union, Canada, Cuba and Mexico.

Dr. Worthing Appointed Superintendent of Pilgrim State Hospital.—Commissioner William J. Tiffany has announced the transfer on December 1, 1937, of Dr. Harry J. Worthing, superintendent of Willard State Hospital to the superintendency of Pilgrim State Hospital, thus succeeding Dr. Tiffany as head of the largest institution for the mentally ill in the United States.

Dr. Travis Appointed Superintendent of Willard State Hospital.—The appointment has been announced of Dr. John Henry Travis to the superintendency of Willard State Hospital to succeed Dr. Harry J. Worthing. Dr. Travis is a native of Ontario and graduated in medicine at the University of Toronto in 1911. During the war he served in the Canadian Army Medical Corps, and has been attached to the staffs of mental hospitals in Massachusetts, Maine and New York, and has recently been acting medical inspector for the New York State Department of Mental Hygiene. His appointment at Willard becomes effective January 1, 1938.

DR. ZIEGLER BECOMES ASSOCIATE MEDICAL DIRECTOR OF MILWAUKEE SANITARIUM.—The appointment has been announced of Dr. Lloyd H. Ziegler, professor of psychiatry at the Albany Medical School and head of the division of psychiatry and neurology of the Albany Hospital since 1930, to the position of associate medical director of the Milwaukee Sanitarium, Wauwatosa, Wisconsin. Dr. Ziegler will also serve on the faculty of the College of Medicine, University of Illinois.

SOCIAL HYGIENE DAY.—National Social Hygiene Day, the second observance of which has been set for February 2, 1938 by the American Social Hygiene Association, marks the high point in the year round effort to gain popular interest and support for the activities of the health authorities and the medical profession in dealing with syphilis and gonorrhea. Interested official and voluntary agencies concentrate their efforts at this time on giving the subject the widest possible publicity, by arranging for meetings of interested groups, press stories and comment, appropriate radio broadcasts, and the like.

The first National Social Hygiene Day, February 3, 1937, was an immediate success in accomplishing its purpose; it was marked by hundreds of meetings held throughout the country. More than a thousand newspaper clippings coming from all parts of the country testify to its uniformly favorable press.

"Stamp Out Syphilis—Enemy of Youth" is the slogan for the 1938 Social Hygiene Day meetings. Particular emphasis will be laid on the control of syphilis among the twenty to thirty year age group, in which more than half of all new infections occur.

Suggestions for meetings and practical community programs may be obtained from the American Social Hygiene Association, 50 West 50th Street, New York City. The Association will be glad to supply interested persons and groups with materials, such as exhibits, films, and literature.

ADVISORY BOARD FOR MEDICAL SPECIALTIES AND GRADUATE MEDICAL EDUCATION.—This Board, organized in 1933-34, for the purpose of coordinating graduate education and certification of

medical specialists in the United States and Canada, and which functions in conjunction with the Council on Medical Education and Hospitals of the American Medical Association, adopted the following resolution at its meeting in Atlantic City, June 6, 1937.

Resolved, That the President appoint four members of the Advisory Board for Medical Specialties with power to add to their number and to form a Commission on Graduate Medical Education to study the problems of graduate and postgraduate medical training, such a Commission to be comprised of representatives of the medical profession, the hospitals, the universities, the medical schools and the licensing bodies.

Dr. Willard C. Rappleye, president of the Advisory Board for Medical Specialties, reports that a Commission on Graduate Medical Education has now been created. The Commission will undertake to mobilize current opinions as to how the problems in this field can best be solved and to formulate the educational principles involved in graduate and postgraduate medical training. It is hoped that standards of training can be drawn up which will be of help to the Council on Medical Education and Hospitals and other agencies concerned with the inspection and evaluation of the facilities needed. There would be no duplication of effort nor conflict with the Council and these other agencies. The results of the studies by the Commission should be of real assistance to the specialty board, the medical profession, hospitals, medical schools, state board of medical examiners, and other institutions and organizations concerned with this phase of American medicine.

The personnel of the Commission on Graduate Medical Education follows:

Fred L. Adair, Chicago, Vice-President, American Board of Obstetrics and Gynecology.

A. C. Bachmeyer, Chicago, Director, University of Chicago Clinics; Former President, American Hospital Association.

Donald C. Balfour, Rochester, Director, Mayo Foundation Member, Board of Regents, American College of Surgeons.

Kenneth D. Blackfan, Boston, Professor of Pediatrics, Harvard Medical School.

James D. Bruce, Ann Arbor, Vice-President and Director of Department of Postgraduate Medicine, University of Michigan; Chairman, National Committee on Post-Graduate Medical Training.

R. C. Buerki, Madison, Superintendent, University of Wisconsin Hospital, Former President, American Hospital Association.

Anton J. Carlson, Chicago, Professor of Physiology, University of Chicago.

Walter F. Donaldson, Pittsburgh, Secretary, Pennsylvania State Medical Society, and former member of Council on Medical Education and Hospitals of American Medical Association.

Reginald Fitz, Boston, Member, American Board of Internal Medicine, Member, Council on Medical Education and Hospitals.

Evarts A. Graham, St. Louis, Chairman, American Board of Surgery.

F. W. Hartman, Detroit, Secretary-Treasurer, American Board of Pathology.

Willard C. Rappleye, New York, Dean, Columbia University Faculty of Medicine, Director, New York Post-Graduate Medical School; Former Director of Study, Commission on Medical Education.

J. Stewart Rodman, Philadelphia, Secretary, American Board of Surgery; Medical Secretary, National Board of Medical Examiners.

Harold Rypins, Albany, Secretary, New York State Board of Medical Examiners; Former President, Federation of State Medical Boards of United States.

Alfred Stengel, Philadelphia, Vice-President in Charge of Medical Affairs, University of Pennsylvania.

William P. Wherry, Omaha, Secretary, American Board of Otolaryngology; Executive Secretary, The American Academy of Ophthalmology and Otolaryngology.

Allen O. Whipple, New York, Vice Chairman, American Board of Surgery; Member, Committee on Graduate Teaching, American Surgical Association.

Ray Lyman Wilbur, Stanford, President, Stanford University; Chairman, Council on Medical Education and Hospitals of the American Medical Association; Former President, American Medical Association; Former President, Association of American Medical Colleges.

John Youmans, Nashville, Director of Post-graduate Instruction, Vanderbilt University School of Medicine.

SOCIOMETRY: A JOURNAL OF INTER-PERSONAL RELATIONS.—This is a new journal, edited by Gardner Murphy, Ph. D., of Columbia University and published by J. L. Moreno, M. D., physician in charge, Beacon Hill Sanitarium, constitutes a fresh attempt to integrate the social sciences. The ingredients that go into the attempt are rather diverse and the synthesis of these ingredients is at the present time obscured. Sociometry is defined in the editorial foreword as the embodiment of a "device for ascertaining and measuring the positive social responses of each individual to each other individual in his social world, a means of describing the degrees and forms of intimacy longed for by each person in relation to each of his fellows" (pp. 6-7). Whether it is a fruitful device for so

doing can only be decided by the future. Whether *sociometry* is a good word to describe such a device is likewise problematical. Insofar as it is an attempt to reduce inter-personal relations to a quantitative basis of formulation, it is merely another attempt to do what all good sociologists since Comte have tried to do. As the quotation shows, however, it is more than reducing human relationships to diagrams. The words "response" and "longed for intimacy" imply a systematic framework within which the relationships are viewed. And as these are psychological words it is obviously a psychological framework. The value of the framework and the method generally can only be tested by its research results, not by *a priori* arguments as to whether, for example, response is the individual counterpart of the biological term adaptation.

The viewpoint of the contributors to *Sociometry* has certain initial advantages over other attempted integrations of social and human studies. It is grounded firmly on two propositions which are stressed again and again—*man* is a creature of his environment and *a man's* environment includes all other men with whom he is intimate. This is a stress badly needed to bring medical and social studies together. The social scientists is too apt to forget the first and the biological scientist to forget the second. Insofar as this new journal refuses to judge between them and emphasizes the importance of both, the part it can play in bringing the two wings together is obvious and its future ought to be assured.

First International Congress on Child Psychiatry.—The first International Congress on Child Psychiatry was held at the Maison de la Chimie, Paris, from the 21st of July to the first of August. The Congress was a very notable success, approximately 300 delegates attending each of the sessions, and 26 countries were officially represented. All the sessions were conducted by the President, Dr. G. Heuyer, and the Secretary-General, Dr. Leon Michaux. The official welcome was given to the Congress by the Minister of Public Health.

The first day of the Congress was devoted to a consideration of the neuro-physiological factors in child psychiatry.

On Sunday, the second day, a visit was arranged to the laboratory of the University and to a children's colony at Perray-Vaucluse where sub-normal and problem children are cared for.

On the third day of the Congress papers were devoted to the problems of the conditioned reflexes. One of the most interesting papers given on this day was presented by Professor Marianesco of Bucharest, Roumania, in which he pointed out the difficulty of the study of conditioned reflexes in the abnormal child, stating that he considered this an important approach toward the grouping of the nervous child, but an extremely complicated one which needed much further scientific work for a more practical development.

The fourth day was devoted to problems in education and a number of excellent papers were presented. On this day one of the outstanding papers was given by Dr. Andre Ombredan of Paris concerning a study of reading and speech disabilities in children.

On the fifth day the subject under discussion was juvenile delinquency and on this day America was represented by Dr. William Healy who gave an excellent paper concerning the work of the Judge Baker Foundation Center in Boston.

On the final day a visit was arranged to the Medico-Pedagogic Institute, d'Yvetot and an excursion in the valley of the River Seine.

This Congress brought together for the first time leaders of child psychiatry from the whole world. It did much to clarify our thinking on childhood problems and was especially helpful in emphasizing the need of scientific methods in these studies and stressing the importance of our educational procedure in the problem of childhood mental health.

The President of the Congress, Dr. Georges Heuyer was especially to be congratulated on the excellent organization of the Congress, the fine attendance and the valuable discussion that was promoted during the meetings.

A. H. R.

PSYCHIATRY: JOURNAL OF THE BIOLOGY AND THE PATHOLOGY OF INTERPERSONAL RELATIONS, is announced to appear about February 1, 1938, and quarterly thereafter. The William Alanson White Psychiatric Foundation, the publisher, states in part: "Psychiatry, as a basic discipline relating to all significant phases and problems of human life and to all human relations, needs at this time a channel of expression that will communicate its growing

insights to a wide audience of those who can make valid contributions to its data, and correct use of its formulations. The wise dissemination of psychiatry was a major interest of Dr. William A. White. The Trustees of the Foundation created to perpetuate his work, developed under his direction, and led in its first years by him, now present as one of their efforts to discharge the responsibility vested in them, a quarterly journal directed not alone to psychiatrists and psychiatric research personnel in the narrower sense, but to all serious students of human living in any of its aspects, and to those who must meet pressing social needs with current remedial attempts." Drs. Harry Stack Sullivan and Ernest E. Hadley and Mr. Thomas Harvey Gill are listed as the Editorial Committee (of the Board of Trustees). The office of publication is shown as 1835 Eye Street, N. W., Washington, D. C.

Book Reviews.

GERICHTSARZTLICHE DIAGNOSTIK UND TECHNIK. Besonders auf dem Gebiete Der Behordlichen Sektion. By *Dr. H. Merkel and Dr. K. Walcher.* (Leipzig: Verlag von S. Hirzel, 1936.)

One may wonder why a note on a textbook on forensic medicine should find its way into the pages of a psychiatric journal and yet it may not be out of place if one bears in mind the difficulties with which the institutional physician and the pathologist are faced. Not infrequently are they confronted with sudden and non-accountable deaths, with suicides and with deaths of violence. To ascertain the exact cause of such deaths is particularly important in institutions supported by public funds such as state hospitals. This volume will be of great help to the pathologist in every psychiatric hospital, and, for that matter, in any other hospital. Both the clinician and the pathologist will find in it a wealth of useful material. It offers systematic and orderly methods in search for the cause of death, based on the most recent progress in the fields of toxicology, chemistry, morphology, etc. A translation into English would be desirable.

J. NOTKIN, M. D.,
Poughkeepsie.

THE PATIENT AND THE WEATHER; CARDIO-VASCULAR-RENAL DISEASE. Vol. IV, Part 1. By *William H. Petersen, M.D.* (Ann Arbor: Edwards Brothers, 1937.)

In accordance with the Hippocratic thesis expounded in previous volumes, Professor Petersen proceeds to develop the concept that, if disease manifestations can be provoked by disturbances in the atmospheric circulation, organic disease can be shown to be referable to such causes. Always the organism is in a state of flux as it responds to varying environmental demands. It is balanced in health, unbalanced in disease. In the production of any or all of the innumerable organic lesions, actually only a limited number of mechanisms have been operative; in all instances, the basic causative factor is oxygen deficiency of varying grades of severity or duration. The greater part of the 663 pages of this volume is given over to careful case reports, tending to demonstrate that the meteorological factor may underlie the very beginning of the degenerative diseases, such as diabetes, nephritis, etc. These diseases are fundamentally of the storm tracks (as has been shown by C. A. Mills, and others), but Dr. Petersen again takes occasion to stress the fact that the meteorological factor is only one conditioning factor in a constellation of events, albeit an important one, influencing every dis-

ease just as it influences every physiological process. This work deserves the most thoughtful consideration because it serves to throw proper emphasis upon an element in disease production which has been sadly neglected since it was first expounded by the Father of Medicine. Dr. Petersen builds up a strong case to prove that "the self-same mechanism that precipitates the final clinical symptomatology is of significance in initiating the earlier disturbances of integration that ultimately cause the clinical entities that we recognize as disease."

The format is as interesting as the text; it is a beautiful example of the lithoprinter's art, while the illustrations and figures are excellent.

B. L. SINCLAIR, M. D.,
Bradford, Ont.

FAMILY CARE OF MENTAL PATIENTS. A REVIEW OF SYSTEMS OF FAMILY CARE IN AMERICA AND EUROPE. Editor: *Horatio M. Pollock, Ph. D.* Contributors: Edgar A. Doll, Ph. D.; Harry A. LaBurt, M. D.; Phillip Smith, M. D.; Charles E. Thompson, M. D.; Charles L. Vaux, M. D. (Utica, New York: State Hospitals Press, 1936.)

One or two sentences in the foreword of this little book are of great import. "This is the first book written in the English language on the subject of family care of mental patients."—"The aim in the preparation of the book has been to present clear pictures of the various systems of family care, to show their advantages and disadvantages and to set forth the opinions of officials in immediate contact with patients and guardians."

Of the eleven chapters in the book, Dr. Pollock has himself written six, while the other five are by men who have special knowledge of the situations described, but all are so correlated as to give the reader clear pictures of family care of mental patients of various types in some of the states of America and some countries of Europe.

One is struck by the tremendous success of the Colony at Gheel in Belgium, which really goes back many centuries, but which since 1852 has developed a boarding out system which surpasses that of any other country in the world. Provision is made for the family care of 3,000 patients and the annual movement of population is about 500 patients. Approximately 25,000 patients have passed through the colony in the past 60 years. The particular plan in use there is described in detail and is illustrated with splendid photographs. Why has the colony plan succeeded in Belgium so much better than in any other country? What factors have built up a state of mind among the Belgian people to adopt this system? Surely it is worth careful study from many angles. From the financial standpoint alone it is estimated that family care of state wards can be provided at about one-half the institutional cost and that about twice as many patients can be cared for annually. And what about the great advantages to the patient resulting from this type of care?

Then go back to Dr. Pollock's introductory chapter which deals with the yearly increasing numbers of mental patients—about 4½ per cent annually—

the cost of equipment and upkeep, and suggestions for developing family care based on the Gheel plan.

All the chapters are well written, and the facts learned from the various colonies described show in every case advantages socially, economically and educationally to states which have adopted this system. Concise, yet not sacrificing detail, this book may be read alike by psychiatrists and by the general public and all those who are charged with the responsibility of the care of the mentally ill.

E. P. Lewis, M. D.,
University of Toronto.

Bewusstseinstypen und ihre Beziehung zur Psychopathologie. By *Dr. J. H. van der Hoop*, Dozent für Psychiatrie in Amsterdam. (Bern: Medizinischer Verlag Hans Huber, 1937).

Dr. van der Hoop's book attempts in a sense an amalgamation of the teachings of Freud and Jung. The author was first analyzed by Jung and later by the Freudian method in Vienna. He takes the stand that it is necessary to make a structural as well as a dynamic analysis of the person. He does not find either method entirely acceptable and modifies them to a slight degree according to his own opinions and experiences.

He differentiates, essentially following Jung, instinct, intuition, thinking and feeling, and accordingly the instinctive, intuitive, thinking and feeling types. All of these and their complications and interrelations are discussed in the first part of the book.

In the second part of the book the author shows how these types can be utilized in psychiatry. He discusses the types in relation to complexes, to neuroses, to psychopathy and to psychoses. In all of these discussions he tries to do justice to the psychoanalytic school of thought, emphasizing that in the treatment of neuroses he is using particularly the Freudian method.

In the concluding part the author presents philosophical considerations. He tries to show how far psychology can be objective and how far it is bound to be subjective, and how, in his opinion, it is possible to reconcile these seemingly contrasting points of view. Then he remarks on unity and transcendence of consciousness. Ultimately he writes on the "personal equation" using as examples the personalities of Freud, Jung and himself.

This is a thoughtful book written by a well experienced, cultured psychotherapist. Although the discussions are sometimes a bit long-winded, it is worth one's while to study this book in which time and time again remarks are found which show unusual insight into structure and dynamics of the personality.

This reviewer feels that the book would be more useful if it had an index.

Eugen Kahn,
Yale University.

THE ETIOLOGY OF MENTAL DEFICIENCY WITH SPECIAL REFERENCE TO ITS OCCURRENCE IN TWINS: A CHAPTER IN THE GENETIC HISTORY OF HUMAN INTELLIGENCE. By *A. J. Rosanoff, L. M. Handy, and I. R. Plesset.* Psychological Monographs, Vol. XLVIII, No. 4. (Princeton: Psychological Review Publications, 1937.)

The principal material on which this study is based consists of 366 pairs of twins with mental deficiency in one or both of the twins in each pair. There is also control material consisting of twins of normal and superior intelligence, groups of siblings, etc.

All degrees of mental deficiency are represented, and in many of the cases the mental deficiency is complicated with infantile cerebral palsies, epilepsy, psychotic manifestations, child behavior difficulties, juvenile delinquency or adult criminality.

The presentation is in nine sections, three of which are devoted to detailed reports of all the cases, dealing, respectively, with monozygotic twins (126 pairs), same-sex dizygotic twins (101 pairs), and opposite-sex twins (139 pairs). There are also some tables in which the main findings yielded by the study have been summarized.

The authors' evaluation of the material is presented mainly in section 7, devoted to *a theory of mental deficiency:*

Hereditary determination of intelligence is one thing, and hereditary factors in the etiology of mental deficiency are another thing. They require separate discussion. The available data seem to indicate that hereditary factors determine merely the potentially maximal intellectual development that may be attained by a given individual. In order that this potentiality may be fully realized certain conditions are requisite, the most important of which are the following: (a) There must not be a germinal damage, particularly to the ovum, such as may produce mongolism or possibly some other form of relative or absolute (*i. e.*, pathologic) mental deficiency. (b) In the embryonic period there must not be any condition interfering with normal development and producing meningocele, encephalocele, or other cranio-cerebral pathology. (c) In the fetal period there must not be any condition interfering with normal growth and resulting in premature expulsion of the fetus, or giving rise to the necessity or a forced delivery, or causing, at full term, an immature and markedly underweight condition of the fetus. (d) In the intranatal period there must not be, by reason of dystocia from any cause, or of prematurity or immaturity, or of poor obstetric technique, a cerebral birth trauma. (e) In postnatal life, especially in infancy and childhood, there must not be a head injury, or meningitis, encephalitis, or other infection with cerebral involvement. (f) In postnatal life, too, there must be such home, school, and general life environment as would foster, stimulate, and provide full opportunity for intellectual development. It is a question whether all these conditions are fulfilled for more than a limited minority of individuals in contemporary society. It is, therefore, also a question whether, in the average case, the results of our intelligence tests represent the full measure of hereditary intellectual endowment, or merely an

expression of relative, if not absolute, mental deficiency attributable to one or more non-hereditary factors. In a given case there is hardly a possibility of being quite assured on this point, even though the case be one of superior intelligence. In a given case the assurance is merely to the effect that the inherited intellectual endowment is at least as high as is indicated by the results of an intelligence test, but may be higher. The existence of relative mental deficiency in persons of normal or even superior intelligence is demonstrated not infrequently in monozygotic twins. In cases of markedly unequal intelligence it must be assumed that the hereditary intellectual endowment is represented at least by the I. Q. of the more intelligent twin of the pair. Among the hereditary factors of intelligence apparently must be counted a sex-linked factor. It would appear that scarcely more than one-half of the cases of mental deficiency are of hereditary origin. We have shown elsewhere that germinal factors were the sole cause of mongolism. Perhaps the most outstanding general result of our study consists in the importance of cerebral birth trauma in the etiology of mental deficiency and of certain complicating conditions with which it is often associated, an importance which has heretofore not been fully appraised. In our material there are barely a half-dozen cases in which postnatal factors are mentioned as possible causes. This is in harmony with general experience. Apparently such factors play but a minor rôle numerically. The bulk of mental deficiency exists from birth. In view of the rather overwhelming evidence indicating that, save in cases of mongolism, the principal non-hereditary factor in the etiology of mental deficiency is cerebral birth trauma, our data almost force the conclusion that cerebral birth trauma is capable of producing now mental deficiency, now an infantile palsy, now epilepsy, now certain types of psychotic disease, now, with significant frequency, a combination of any two or more of these conditions. Whether in a given case a cerebral birth trauma shall result in stillbirth, or in death in the neonatal period or in early infancy, as it often does; what degree of mental deficiency it shall produce; whether it shall give rise to one or another of the above-mentioned complicating conditions; whether it shall produce but a relative mental deficiency, *i. e.*, leaving behind an intellectual capacity which is still within normal limits; or whether it shall leave the subject without damage to his neurologic or intellectual function, are, presumably, matters determined by the nature, extent, and localization of the brain injury and by the course of the subsequent tissue reaction.

AUTHORS' REVIEW.

LATER CRIMINAL CAREERS. By *Sheldon and Eleanor Glueck*. (New York: The Commonwealth Fund; London: Humphrey Milford, Oxford University Press, 1937.)

The publication of "500 Criminal Careers" in 1930 marked the beginning of a series of monumental contributions by the Gluecks to our knowledge of what becomes of discharged prisoners. In that volume, based on detailed and first-hand studies of the careers of 510 prisoners during the five year

period immediately following the expiration of their sentences (1921-22) to the Massachusetts Reformatory, it was demonstrated that the oft repeated optimistic statements of officials concerning the proportion of parole successes (sometimes given as 80 or 90 per cent) were not at all consistent with the facts; that, indeed, nearly 80 per cent of the ex-prisoners had relapsed into delinquency during the period studied! Similar studies have since been made by the Gluecks upon the results of juvenile court treatment ("1,000 Juvenile Delinquents") and of treatment in a reformatory for women ("500 Delinquent Women").

The present volume, like the others, is a valuable one. It deals with the very men studied in "500 Criminal Careers" during their second five year year post-parole period, or at least with the 454 survivors of that group, with a particular view to ascertain the effects of the passage of time upon conduct, what are these influences of increasing years, and what are the effects of the social transformations which come as time goes on.

In general, they find that there has been among the ex-prisoners studied, an upward trend during the period under study, in environmental circumstances, in family relationships, in industrial adjustment, and in the use of leisure time. No general improvement has been noted in the manner of meeting economic responsibilities (the depression was quite likely a factor in this regard). A considerable improvement in the criminal conduct of the group is noted—32 per cent were non-delinquent during Period II, as compared with 21.5 per cent during Period I (the first five year post parole period). This trend has been upward even during the second period; in the fifth year of the period 42.7 per cent of the men had become non-delinquent (p. 76). No conclusion as to the causal effect of the upward economic and social trends is drawn, however, the authors contenting themselves with the statement that (p. 87) "Good family relationships, the assumption of economic responsibilities, successful industrial adjustment, and wise use of leisure, in large measure accompany non-delinquency."

One of the most interesting findings is a modified verification of the impression that criminality tends to diminish after the third decade of life. Statistically the authors find that "aging is the only factor which emerges as significant in the reformative process," and therefore infer that "the principal explanation of the reform which has occurred in one group is to be found in that factor" (p. 105). In the 31-35 year group the increase in non-delinquency increased from 14.7 per cent at the beginning of Period I to 34.3 per cent for the beginning of Period II. This increase is cumulative, since the reformation of a considerable number had occurred in the third decade of life. Apparently after the age of 36 reformation "declines and dwindles to almost nil" (p. 106).

Of especial interest to the psychiatrist is the weighty importance of mental abnormality—in the broader sense—as an impediment to reformation. In fact, "in nine-tenths of these cases the failure of the men to improve appeared, on consideration of the factors and mechanisms in each case, to be clearly due to some mental or marked personality abnormality—psychosis, psychopathic personality, alcoholism, sex perversion, drug addiction, great emotional

instability, and the like" (p. 125). The diagnoses have reference to the condition at the time of admission to the reformatory (about 20 years ago), not to the present diagnosis. (Most of the diagnoses were made by Dr. Guy G. Fernald, one of the pioneers in the field of psychiatry as applied to correctional institutions.) Mental deficiency or retardation was considered separately, and was found to play a much less important rôle than mental deviation. The increasing importance of the factor of mental deviation is emphasized in chapter XII, on "Predicting Criminal Conduct."

In "500 Criminal Careers," the most thorough scientific attempt up to then was made to establish a prognostic table by use of the statistical method of the "coefficient of contingency" (see p. 181-2, that volume). Of the six factors then employed, mental abnormality on entrance to the reformatory was number six in order of rank of coefficients. Employing the data developed in the present study and thus taking advantage of a ten year observation, mental condition is found to be easily the most predictive of the five pre-reformatory factors employed in the present prognostic table. The coefficient of contingency has increased from .26 in Period I to .43 in Period II, the next highest coefficient in the table (work habits) being .35.

The construction of prognostic tables such as those which have been carefully elaborated by the Gluecks represents one possible contribution of statistics to penal administration. The authors emphasize the fact that no such table is meant to be mechanically applied; on the other hand, the "objectified and organized experience with hundreds of similar cases" can lend valuable aid to the exercise of discretion. Would that more parole boards were able, by training and intelligence, to profit by such pearls as the Gluecks have spread before them in abundance!

One lesson from this study is the need for a completely indeterminate sentence or a broad zoned one (one with a wide spread between maximum and minimum) to cover all serious offenders, together with a "more scientific parole policy and technique enforced by a trained personnel" (p. 207). The possibility of new procedures, too, is suggested, such as a more intelligent and realistic dealing with the chronic alcoholic. Finally, the desirability of a "treatment tribunal" is urged once more—a concept which is gaining steady ground among students of the law. The chance, indeed the assurance, that changes such as those urged would be far more effective and less expensive than the present method hardly needs to be argued.

Copious appendices, on method, definitions, code-table index, period comparison tables, correlation tables, and comparison of percentages of non-delinquency in Periods I and II are provided. In this manner, ample supporting data are ready to hand for any temerous enough to doubt the Gluecks' statistics or to try to add to them!

The volume is a substantial addition to our knowledge of the graduates of our correctional (?) institutions, and should be closely read by every one seriously interested in improving the present all-too-ineffective mechanisms whereby society attempts to deal with those who come into conflict with its laws.

WINFRED OVERHOLSER, M. D.,
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FOURTH ANNUAL REPORT OF MENTAL INSTITUTIONS. DOMINION OF CANADA. (Ottawa: Dominion Bureau of Statistics, 1935.)

This report represents a summary of the significant data concerning mental institutions in Canada for the year 1935, along with some comparative data for each of the four years (1931 to 1935) for which a similar report has been made. It is the fourth in a series of analyses of significant data in connection with mental institutions in Canada.

The report is presented in two sections. Part I deals with administrative aspects, general statistics of movement of patient population and statement of finances in all mental institutions in Canada. Part II includes special and detailed information in the form of tables covering first admissions, readmissions, discharges, transfers and deaths in public mental hospitals, together with detailed classifications of the various psychoses of patients and a large body of other important data made available by the card system which is now in use in thirty-one public mental hospitals in Canada.

There were 56 institutions in Canada at the close of the year 1935, of which 36 were maintained and controlled by provincial authorities, 14 by counties and municipalities, 2 were under the management and control of the Dominion Government and 4 were conducted by private agencies. Of the 56 institutions, Prince Edward Island and New Brunswick each had one, Saskatchewan had two, Alberta, Manitoba, and British Columbia each had four, Quebec had nine, Ontario had fifteen, and Nova Scotia had sixteen. There are two institutions less than there were in 1934, Ontario and British Columbia each having one less.

There is a marked increase in patient population in institutions in 1935 as compared with that of 1934. The total number of patients on the books of these institutions on December 31, 1935 was 41,216 as compared with 39,097, the total number of patients on the books on January 1, 1935. There were 10,869 admissions in 1935. The daily average resident patients for the year 1935 was 38,052 as compared with 36,571 in 1934. There was an increase of 4.3 in the number of mentally ill in residence. The provinces of Alberta, Nova Scotia and Ontario showing the largest increases, Prince Edward Island showing the smallest increase and British Columbia the only province showing a decrease. The proportion of patients in residence per 100,000 was 348.2 at the end of year 1935 as compared with 335.6 for 1934.

There is some information with regard to overcrowding which indicates a rather serious situation. In 1931 the normal bed capacity was 31,832 and the patients in residence, 31,686. In 1935 the normal bed capacity was 35,987 and the patients in residence, 38,261; with a per cent of excess over capacity of 6.3. While the normal bed capacity in 1935 represents a 13 per cent increase in bed capacity over that of 1931, the patients in residence at end of the year 1935 show an increase of 20 per cent during the same period.

There were 10,869 direct admissions in the year 1935, of which 8,703 or 80.07 per cent were first admissions and 2,166 or 19.93 per cent were readmissions. This shows an increase of 10.02 per cent for first admissions and

13.64 per cent for readmissions over that of 1934. Of the first admissions, 78.7 per cent were classed as insane. Of those, dementia præcox and manic depressive constitute the two largest groups, with 21.7 per cent of total first admissions for the former, and 12.9 per cent for the latter. The dementia præcox group shows a decrease of 1.4 per cent as compared with 1934. The number of first admissions in the non-psychotic group has shown a steady increase each year of the four-year period. Of the readmissions, 29.2 per cent were in the manic depressive group and 28.4 per cent were in the dementia præcox group. There were 4,356 patients discharged from hospitals, of which 1,216 or 27.9 per cent were discharged as recovered, 2,160 or 49.6 per cent as improved, 275 or 6.3 per cent as without psychosis, 687 or 15.8 per cent as unimproved, and 18 or 0.4 per cent as unclassified. The deaths numbered 2,192.

The total personnel for the 56 institutions was 7,017. The personnel in the 39 institutions devoted exclusively to the care of mental patients totalled 6,383, which was an average of 5.7 patients for each employee, an average of 172 patients to each physician, and an average of 44.9 patients to each graduate nurse.

The total expenditure for the 39 hospitals devoted exclusively to the care of mental patients was $9,659,274.27, of which $7,960,187.42 was used for maintenance expenditures and $1,699,086.85 for non-maintenance expenditures.

The significant figures, I think, are those which indicate a steady increase in the number of patients in residence from the years 1931 to 1935. There were 31,686 patients in residence in 1931; 32,878 in 1932; 34,979 in 1933; 36,571 in 1934; and 38,261 in 1935. There is no conclusive evidence as to the cause for this increase, but it is stated that, "Whatever causes may be assigned to this continual rise in the mental hospital population, it is evident that the demand for accommodation in our mental hospitals has become a pressing problem and gives some grounds for anxiety."

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THE INTELLECTUAL FUNCTIONS OF THE FRONTAL LOBES. (A STUDY BASED UPON OBSERVATION OF A MAN AFTER PARTIAL BILATERAL LOBECTOMY.) By *Richard M. Brickner, B.S., M.D.* (New York: Macmillan Co., 1936.)

Doctor Brickner and his collaborators have carried out an exhaustive study of a patient who had had most of both frontal lobes removed. Doctor Dandy operated on the patient and carried out the resection of the frontal lobes to gain sufficient exposure to permit the complete removal of a large midline meningioma. As the tumor was completely removed, and also because there was no evidence of increased intracranial pressure at the time the studies were made by Doctor Brickner, it is reasonable to assume that mental variations from the pre-operative state were due to the bilateral loss of frontal lobe tissue, rather than to abnormal functioning of the remaining brain tissue.

A large part of the book is given over to a verbatim report of conversations which the patient had in various surroundings with different people. These conversations have been grouped in a well thought out scheme to illustrate different mental defects. Doctor Brickner analyses this material in an interesting and capable manner, however the studies are reported in sufficient detail to enable the reader to draw an independent conclusion.

Doctor Brickner concludes that the primary defect was a diminution in the ability to synthesize, thus placing a limit upon the degree of attainable complexity of thought. The patient showed lack of restraint in even ordinary situations and was incapable of adequate adjustment to his environment, requiring constant supervision.

An important surgical conclusion to be drawn from this one case is that bilateral frontal lobectomy should never be done. This is in contradistinction to unilateral frontal lobectomy which has been performed many times and with satisfactory results, provided there is no great involvement of the other frontal lobes by tumor.

The care and detail which has been expended in the study of this case is to be highly commended. The book is very readable and will remain of great interest to neurologists, psychiatrists and others who are desirous of gaining more knowledge concerning the function of the frontal lobes.

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CHILDREN HANDICAPPED BY CEREBRAL PALSY. By *Elizabeth Evans Lord.* (New York: The Commonwealth Fund; London: Humphrey Milford, Oxford University Press, 1937.)

This book represents an effort to summarize experience gained from the examination and follow-up of more than 300 cases of cerebral palsy. With few exceptions these cases were studied at the Children's Hospital in Boston. Particular attention is given to practical methods of psychological diagnosis and prognosis in relation to home management, muscle training, and more formal scholastic education.

Dr. Crothers has given in Chapter I an explanation of cerebral palsy and a glossary of medical terms for those unfamiliar with the neurological implications of the diagnosis. It seems to the reviewer that Dr. Crothers underestimates the capacity of his readers and sometimes diverges from fact. For example, he says: "The essential point is that cerebral control of the activities of the body can be divided roughly into: (a) control of balance from the cerebellum; (b) control of associated movement which can be attributed to the basal ganglia; (c) voluntary control from the cortex." This is too simple to be true. Moreover a great opportunity is lost when Crothers so grossly abbreviates his neurological observations. Two or three chapters of great importance could well have gone in at this point setting forth the correlations between the observations of the neurologist and those of the psychologist on this unique group of children. It is hoped that Crothers is only biding his time and will later produce this data.

Chapter II presents a brief discussion of the psychological aspects of the treatment of physical disability. Directed voluntary activity, such as exercises and games, and methods of securing relaxation and developing muscular control are described. The measurement of results in terms of the increased efficiency of the child is also discussed. The further development and use of such practical standards of comparison will lead, it is hoped, to earlier and more accurate prediction with respect to the child's future degree of physical independence. Changes in physical efficiency by which a child moves from dependent to semi-dependent to independent activity, have a profound effect upon an educational program. This chapter would be improved by making the statements somewhat more categorical; the author is so cautious that she could be charged with circumlocution. Also, figure three would be improved by a graph showing normal development with which to compare the graphs of the motor development of the eight disabled children.

A method of appraising the mental status is found in chapter III. Instead of attempting to describe the mental capacity of a child in terms of a general intelligence level, test situations have been selected that will indicate abilities and disabilities in relation to chronological age and variations in achievement. Through repeated examinations it must lead to a prediction of educability. If the testing program is to have any practical value, it must bring out these variations in achievement, so that parent, doctor, and teacher can understand why a child who seems bright to one person seems stupid to another. Some interesting observations on reading defects are mentioned. In these children there are evidently syndromes of agraphia, alexia and acalculia not seen by the general neurologist. The emphasis on "focus" and "visual field" defects seems wrong to the reviewer. It is more likely that the defects are in the comprehension of symbols.

There are many aspects of behavior which can be considered as indications of intelligence. In chapter IV these are discussed in relation to the mental test situations. Mental tests have value insofar as they offer an objective explanation of the differences of opinion which almost inevitably arise in connection with a handicapped child. Significant findings on repeated examiation are presented and three characteristic types of mental development are described: (1) Those cases in which the mental development was consistent and progressed at a constant rate. (2) Those cases where the tests revealed a demonstrable and relatively rapid advance in mental development during the early preschool years, but later showed retardation. (3) Cases in which the irregularities in mental development gave a behavior picture that is difficult to appraise and still more difficult to interpret to doctors, teachers, and parents as the usual terms—mental age or mental level—did not apply. In the situations dealing with language the child may show an adequate, even advanced, vocabulary for his age. In contrast to this ability in the use of language, he may have the disabilities: he may show poor discrimination of form, varying from a difficulty in distinguishing between letters to a failure to recognize pictures. He may also show an inability to reproduce the direction of lines. This difficulty is not due to incoordinate motions that prevent the

grasping or retention of a pencil, but seems to be based on a kinaesthetic defect which hinders the appreciation of the motion required to produce the desired result. Difficulties in number concept in the preschool years indicated difficulty in arithmetic later. With these irregularities in achievement, it is not strange that a wide range of opinion as to the child's mentality is often expressed and the parents stand perplexed in the midst of conflicting advice. Mental tests have clinical value insofar as they present an objective analysis of the mental condition, which by its clarity will reduce the conflict of opinion and give a sound and convincing basis for educational plans.

The teacher's problem is briefly sketched in chapter IV, and some of the emotional problems of mother and child are discussed in chapter V. Through the early months many spastic children are feeding problems, and poor habits of eating and sleeping are set up which are later difficult to change. These children are a severe strain on the parents, but if at an early age they can be conditioned to a regular routine they may lead happy lives. The more defective children are easier to handle because they accept life with equanimity.

Much thought is given to the correct approach to the parent. Sometimes it is easy to explain the true situation to them. More often the parents, listening to the report in a highly emotional state of mingled fears and hopes will reject the painful ideas and cling to whatever they can interpret as encouraging. It is highly desirable that the person explaining the diagnosis should obtain in the initial contact as clear a picture as possible of the parent's fears and hopes and of the meanings they have attached to the words used in diagnosis. He can then use their language and avoid confusion. Advising institutional care is most difficult. Even though commonsense and regard for other members of the family indicates clearly the necessity for institutional care, the mothers usually insist on looking after the child at home, so the physician must watch her and try to protect her from useless self-sacrifice, and harmful sacrifice of other children.

The book is brief and to the point. It contains much useful information and pertinent advice for neurologist, pediatrician and psychologist.

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THE MORPHINE HABIT AND ITS PAINLESS TREATMENT. (2nd edition.) By *G. Laughton Scott.* (London: H. K. Lewis & Co., Ltd., 1937.)

This book describes a method of withdrawal treatment designed to ameliorate the abstinence phenomena which occur when morphine and its derivatives are withheld from addicts who have become dependent upon them. The author claims that with the use of this method withdrawal is "painless" and he attributes this to his technique of administering Lambert's "special mixture" (2 parts 15 per cent tr. belladonna, 1 part fld. ext. hyoscyamus, and 1 part water). This technique involves the administration of small doses (5 to 60 minims) of the "special mixture" hourly for several days, together with large doses (2 to 15 grains per day) of "luminal," while morphine is

being rapidly reduced. The object of this dosage technique is to develop a high belladonna tolerance in the patients. The author feels that he can thus maintain "constant vagal preponderance," and that this corrects the sympathetic-parasympathetic imbalance which occurs during withdrawal. The maintenance of a normal pulse rate is the criterion of "special mixture" dosage: increases in pulse rate indicating that the increases in dosage have been too great. The treatment of three cases is described, and summaries of 20 consecutively treated cases are presented. The criterion of successful treatment is freedom from subjective withdrawal discomfort.

In none of the cases was the presence of physical dependence established prior to the administration of the treatment; no control data are presented for comparison of this treatment with (1) rapid reduction only, (2) rapid reduction with only "luminal," or (3) rapid reduction with only "special mixture"; and no description is given of objective manifestations of abstinence exhibited by patients receiving this type of therapy.

The atropine equivalents of the total amounts of "special mixture" administered per day (assuming that only 10 hourly doses were given daily) would range from 1.25 to 15 mgm. Sollmann (A Manual of Pharmacology, 4th edition, page 394) states that ". . . . the continued use of small doses (of atropine) establishes partial tolerance to the toxic action, but not to the effects on the vagus or occulomotor." Any manifestation of augmented vagal tone would, therefore, be difficult to conceive of in the presense of paralysis of the peripheral distribution of the cranio-sacral autonomic nerves. A more tenable explanation would seem to be that this treatment probably utilizes the maintenance of sub-toxic atropinization while the patient is undergoing a sensible rapid reduction. The use of large doses of "luminal" would seem to indicate lack of the specificity of the "special mixture" for amelioration of abstinence phenomena.

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Reading, Writing and Speech Problems in Children. By *Samuel Torrey Orton, M. D.* (Thomas W. Salmon Memorial Lectures.) (New York: W. W. Norton & Co., 1937.)

This is an important monograph because it sums up ten years' work and gives Orton's recent conclusions. His principal thesis is that there are striking inherent or constitutional differences in certain children, apart from those of general intelligence, which influence their acquisition of the language function. It is toward a better understanding of these differences and their treatment that the studies which are reported in this volume were directed.

The neurological background is covered in chapter one where there is a brief discussion of aphasia and laterality. Concerning handedness he states: "The great degree of individual variation which has become increasingly apparent as our studies of laterality have progressed makes it clear that no dogmatic general answer can be given to the question as to whether a left-handed child should ever be trained on the right side. The question can be

answered only for a given individual after tests and observations of the child himself, and even then it is sometimes necessary to experiment with a period of training and, in one or two instances, such an experimental period demonstrated that our first opinion based on history and tests was not leading to the expected results in training and it was necessary to change the program completely. One other factor which must be considered here is the age of the child. As will be elaborated in a subsequent chapter, there are certain periods in a child's development—notably between two and three, and six to eight years of age—which are critical in the development of the language function, and interference with inherent handedness patterns at these times seems much more prone to give rise to difficulties than at others."

Developmental alexia is discussed at length. It is a sensory disorder, primarily a difficulty in the recall of word pictures. It is synonymous with congenital word blindness, strephosymbolia or, more simply, specific reading disability. Being sensory, it is not associated with handedness, either right, left or crossed patterns, but there are an unusual number of the latter found among these children (*i. e.*, right-handed and left-eyed). Combined with developmental alexia, or independently, one finds the syndrome of developmental agraphia. This is the most specific of the syndromes described. It is a special writing disability usually the result of faulty training, an enforced shift of handedness or marked "motor intergrading" (lack of preferential choice of a master hand). Developmental word deafness is a more rare, but more severe condition, difficult to recognize because of its superficial resemblance to general lack of intelligence. Left-handedness is present in "most" of the families of these children, and the child himself often shows motor intergrading. Developmental aphasia and apraxia are very rare, and apparently are included for orderliness and completeness of exposition.

Stuttering is only briefly discussed, the author believes that the speech defect causes so many social difficulties that a great emotional overlay is accumulated. "The emotional and personality factors which are so striking later and which have led many observers to classify all stutterers as neurotics, are notably absent in childhood. Many early stutterers when seen within the first year of their difficulty show no demonstrable deviation in the emotional sphere and present no history of environmental or psychological difficulties which seem at all adequate to explain the disorder. For this reason and since this volume deals largely with the developmental period of language, attention will be given here only to the phenomena of stuttering as they are seen in early childhood." "Many" stutterers show impediment as soon as they begin to talk. "Some delay" in beginning speech and in preferential handedness is common. It is "very common" to find an association with writing disability. The factor of inheritance is illustrated by nine brief family trees, showing various combinations of left-handedness, ambidexterity, stuttering, alexia, and agraphia. The emotional reactions and behavior patterns are discussed in ten pages. From the author's experience of "nearly a thousand cases of various types" he believes that the neurosis is the result, not the cause of speech difficulty. He "usually" obtained a history of "entirely normal development—physical, emotional and mental."

Orton's interpretation of the problem seems to boil down to this: inheritance plays a rôle in many cases of reading, writing and speech defects. Therefore the disorders are not entirely due to environmental and developmental factors, for inherited traits are due to structural differences in the genes. The cerebral hemispheres, although they appear alike anatomically, are unequal in their effectiveness, the left is usually dominant. The important process in speech development is the laying down of engrams. This is a physiological process taking place during the first eight years of life.

The last 43 pages of the book are devoted to treatment, and the methods used are described rather at length for alexia, agraphia and stuttering. Many stutterers turn out to have strephosymbolia and training is instituted to increase the superiority of the master hand. Phonetic training is given if there is imperfection of speech sounds. Reading is helped by pencil facilitation, *i. e.*, tracing the difficult initial letters as they come in reading aloud. The demand of oral responses is reduced to the minimum. The emotional factors must be carefully studied to prevent the development of personality disorders. In conclusion, Orton says: "The view here presented that many of the delays and defects in development of the language function may arise from a deviation in the process of establishing unilateral brain superiority in individual areas, while taking account of the hereditary facts, brings with it the conviction that such disorders should respond to specific training if we become sufficiently keen in our diagnosis and if we prove ourselves clever enough to devise the proper training methods to meet the needs of each particular case."

This work of Orton's deserves admiration. It has opened a whole field in child psychology. Nevertheless, several things in the book should not pass without criticism. The summary of aphasia is too condensed to be accurate and lacks references. The illustrations are crude and give an impression of final knowledge that is not in accordance with the often debatable facts. The original lectures were prepared for a medical audience, and it is to be deplored that in making them into a book, the author has attempted the impossible task of popularizing one of the most difficult chapters of neurology.

Orton's emphasis is on the importance of establishing normally a unilateral brain superiority. The evidence presented does not seem to the reviewer to justify such emphasis. The facts usually called psychological are given little consideration. The evidence for an inherited neural basis or a developmental physiological basis would be greatly strengthened if data were presented concerning these "nearly a thousand cases." One is left unconvinced when merely told certain traits are found "usually" or in "most cases." The scientist wants to see the evidence, and have concrete data. It means little to say that an "entirely normal" history of development was obtained unless one knows how much was investigated in how many cases. In fact *entirely normal* means (accurately speaking) *completely average*, and the reviewer doubts if any human history is just that. Important as the structural and physiological factors in the development of the language function must be in these children, and great though Orton's contribution certainly is, me-

thinks he doth protest too much against the psychological possibilities. The very fact that he considers that they "should respond to specific training" puts them into a category that most people would consider psychological. It reminds one of Pavlov's refusal to admit that there was any such thing as psychology!

Moreover, Orton leaves one hanging between the horns of a philosophical dilemma when he tries to distinguish between structural defect and physiological disorder. He says: "Since the normal pattern in the adult is a concentration of control of the functions under discussion in the hemisphere opposite to the master hand, and since our clinical observations show so wide a variation both in time and degree in the development of a selective preference for either side in many children, it is suggested that these disorders in language development may derive from a comparable variation affecting the essential language areas of the brain and thus rest on a basis largely physiological in nature and not dependent on defect or destruction of any part of the cortex."

Just what is the "comparable variation"? It apparently refers to lesions which cause aphasia in the adult by interfering with the function of speech centers in the brain. It seems to the reviewer that language and other symbolization is learned by a process of association, a high-level nervous activity of certain structural areas of the cerebral cortex. The inherited structure differs from person to person. During the laying down of the associations the many incidental, concomitant stimuli are probably important in conditioning the symbolization. Thus the intimate life history of each child while learning to speak is of great importance. Even if exactly similar lesions could occur in two different people the resulting speech defect would be different—in one the loss might be of German and in the other English, to take a simple example. The structural defect causes a disturbance of function that produces symptoms which vary widely according to the environmental conditions at the learning period. In other words, the problem is psychological, physiological, and anatomical. Trying to draw lines between these three is useless for the student of language development. The injuries that cause speech symptoms (be they pedagogical stupidities of apoplexy) cause a defect in the individual speech of that one person; they disrupt a psychologically determined pattern. The "developmental disorders" are, of necessity, psychological, even if the term carries with it bothersome connotations to neurological purists.

On page 155, Orton says, "We cannot at present accept the hereditary *transmission* of a purely functional character and believe that the passing on from the family stock of a strong preference for the use of the right or the left hand must rest on the transmission of a *better brain structure* in the left or right hemisphere, respectively, which in turn, leads to the development of a functional superiority." Certainly! But, one cannot accept the *existence* of a "purely functional character." It has to be a function *of* some structure or it would not exist. The book contains much that is interesting and im-

portant, but the lack of data is disappointing and the interpretations are neither clear nor convincing.

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LA MÉTHODE PSYCHANALYTIQUE ET LA DOCTRINE FREUDIENNE. Tome I, II. By *Roland Dalbiez*. (Paris: Desclée de Brouwer & Co., 1937.)

The title of these formidable two volumes succinctly reemphasizes the dichotomy—frequently overlooked—pervading psychoanalytic literature. The text stresses this basic differentiation obtaining between the exploratory method of free association and the exegetical elaborations of psychoanalytic doctrine.

In critique of method, Dalbiez professes his personal convictions of the extraordinary merits in free association, illustrating its revelatory prowess in several clinical case records; and little else.

There is no differentiation made between exploratory association and therapy. Discussion or comparison of the multiple means of harnessing the technique to render it productive is totally lacking. No mention is made of "activity," "passivity," "transference," and other pragmatic details, the abuse of which will liquidate, if not the method itself, then certainly its potency. The inexorable necessity of creating an intimate human affinity in the analytic situation escapes him, as does the realization that this human relationship between patient and analyst is the *sine qua non* of the therapeutic method.

From the case material cited by the author, it is evident that his thinking is allied to an early, ingenuous Freud, of the "cathartic" period, when psychoanalytic method was an alarm clock, which, once started, would spontaneously, after an appropriate lapse of time, ring out the pathetic bleating of an infantile traumatic episode, the patient then arising invigorated to plunge boldly into a new day.

At this late date then it is insufficient in a recondite text to give simple approbation to free association. Psychoanalytic method includes a therapeutic fraction with unique technique, procedure and implication, which must be delineated.

In exposition of the Freudian doctrine, divisible into psychology and philosophy, Dalbiez proves equally uncritical. Most informative is his orientation of Freud in the philosophic zodiac, indicating that his affiliation is with realism and empiricism. Dalbiez deems the former a valid ontologic position, demonstrating *en passant* the dialectic incompatibility between idealism and the unconscious. But epistomologically, as a militant rationalist and believer in "spiritual values," he categorically denounces the excursions of empirically grounded Freud into morality, art and religion.

Consistent with his philosophic adjudication, the author distinguishes between "superior" and "inferior" psychic processes. In the former is allocated reason, judgment and will; in the latter, emotions, affect and instinctual proclivities. The "superior" processes are alleged to be the more

"human"; and "L'oeuvre de Freud est l'analyse la plus profonde que l'histoire ait connue de ce que, dans l'homme, n'est pas le plus humain."

Although few individuals today will defend the Freudian theses in religion and aesthetics, any postulation of an intra-psychic hierarchy of value appears no more tenable. In somatic analogy, the heart is no more or less important than the brain. A man without an affect is by so much less a man. Affect can abet or undermine reason. The concept *man* comprises a totality of entities, relations and phenomena, any discussion of whose comparative value only descends into dialetic logomachy.

Yet what is certainly true is that Freud has never occupied himself with definitions of reason and judgment, confining himself to demonstration that an intellectual process is never pure and undefiled, but is inevitably and ubiquitously modified by "inferior" human processes.

Withal, Dalbiez apparently accepts unquestionably most of the basic Freudian dogma. No logical projectiles strafe the poorly fortified Freudian notions of "Anxiety," "Repetition Compulsion," "Narcissism," "Masculinity and Aggressivity," "Femininity and Passivity," "Oral, Anal and Urethral Erotism," "Œdipus Complex," "Fixation," "Instinctual Energies," etc.

He does question, however, the omnipresence of infantile sexuality and correctly prefers to consider children as "polymorphously pervertable," rather than as "perverse." In consequence, he labels adult sexual perversions as "paradifferentiations" and not as infantile fixations.

Dalbiez nurtures another characteristic typical of Freud. Both seek physiologic affirmation for the validity of psychologic tenets. Freud resorted to instincts; Dalbiez quotes Pavlov and overlooks that there is no parallelism but only interesting analogy between the behavior of a canine salivary gland and the behavior of man.

In fine, the two authors suffer a common defect in failing to detect the inexorable importance of sociologic considerations in the genesis of human activity. Both are unaware that psychopathies are strictly definable only in a given cultural setting and that sociologically ordained motives can be as significant as instincts in mobilizing human behavior.

With a newer knowledge available in anthropology and social psychology, a text, purporting to view psychoanalysis philosophically, which omits such contemplation, is certainly open to censure and reproach.

MEYER MASKIN, M. D.,
Bellevue Hospital, New York City.

MEDICINE AND MANKIND. By *Benjamin P. Watson, M. D., Howard W. Haggard, M. D., Harlow Brooks, M. D., George Draper, M. D., Foster Kennedy, M. D., Elmer V. McCollum, Ph. D.,* and *Alexis Carrel, M. D.* (New York and London: D. Appleton Century Co., 1936.)

Not all the currently circulating books avowing the purpose of assisting the layman to keep abreast of the progress of science can be set down, as good and useful books. The present volume however is one that serves its

purpose and offers delightful reading. It represents a group of lectures to the laity instituted by and delivered at the New York Academy of Medicine.

Dr. Benjamin P. Watson, Professor of Obstetrics and Gynæcology at Columbia University tells the story of the growth of knowledge of the anatomy and physiology of the human body, a narrative of romance and tragedy as well as scientific triumph. The reader is introduced to the great discoverers and the contribution of each is succinctly reported. We learn of Herophilus of the School of Alexandria, "the first real human anatomist," of Erasistratus, "the father of physiology," of Galen who learned much of his anatomy from treating wounded gladiators, of Vesaluis who dared to attack the Galenic tradition and became the founder of the modern science of anatomy.

It is of great interest to note how large a part renaissance are played in the development of the new science, especially the work of Leonardo da Vinci who, many commentators believe, profoundly influenced Vesalius.

Dr. Howard W. Haggard, Associate Professor of Applied Physiology at Yale University, contributes a chapter on medicine in the days of Louis XIV, an epoch which extended from 1643 to 1715. The illnesses of the monarch form the basis of this discussion, and since the royal contacts were with nearly all branches of the healing art his medical history affords a good index of the state of the science of his time. His first illness was small pox, contracted at the age of nine; next came a chronic venereal infection at 17; at 20 a fever probably typhoid; at 25 measles from which the King nearly died; then a long series of intestinal disturbances rightly or wrongly attributed to tapeworm (the author suspects indigestion from dietary indiscretions, associated with dental caries and pyorrhœa); at 47 a rectal fistula; and finally with the inroads of old age, gout, stones in the bladder, a gangrenous leg, arteriosclerosis. The grand monarch had need indeed of greater science than the medicine of his day could boast, but his pathology served at any rate some purpose. "Whatever may have been the benefit that Louis derived from medicine—and in some cases it was problematical, to say the least—there can be no doubt of the practical benefits conferred on medicine by the patronage of Louis."

Dr. Harlow Brooks, Emeritus Professor of Clinical Medicine at New York University, whose death occurred before the appearance of this book, writes on the contributions of the primitive American to Medicine. Pointing out that much of the medical lore of the early settlers was derived from the Indian medicine men, Dr. Brooks discusses the healing methods of the original inhabitants of this continent. They were skilled in the reductions of fractures and dislocations and in the treatment of wounds. The use of obstetric forceps and methods of dilating the cervix in delayed labor are reported, likewise the control of hemorrhage and even contraceptive measures. The Mayas performed amputations and made use of artificial limbs, and accomplished both cæsarian section and symphysiotomy in difficult labor. They practiced a kind of dentistry, including the fitting of false teeth.

Among the drugs in use by the Indians may be mentioned cocaine, and other hypnotics, cascara and saline laxatives, astringents, emetics and diuretics, quinine, salicylic acid (decoction of willow bark), digitalis.

Dr. Brooks rightly ascribes importance to ceremonial and ritual as an integral part of Indian medicine. From their clever use of suggestion the white man has something to learn. There is food for thought in the remark of an old Navajo medicine man: "You white men can treat some diseases a great deal better than we can, such things as gallstones and appendicitis, but I can treat some diseases much better than you can, such as diseases of the spirit."

As "the common denominator of disease" Dr. George Draper, Associate Professor of Clinical Medicine at Columbia University, develops the theme, adorned if not illuminated by some curious diagrams, of the individual otherness of each person as a factor in his tendency to illness. In some diseases the pathotropic tendency serves to act like a secondary sex character (gallstones and exophthalmic goiter more frequent among women; gastric ulcer more frequent among men). Draper mentions briefly some of the investigators who have contributed to the current concept of constitution, a composite of anatomical, physiological and psychological qualities with individual peculiarities of capacity and resistance which underlie the proneness to disease. This section partakes somewhat of the nature of a chalk talk.

The most original and stimulating chapter in this book is the discussion of the organic background of mind by Dr. Foster Kennedy, Professor of Neurology at Cornell University Medical College. By opposite examples he demonstrates how many aspects of what we call reason are determined and modified by bodily states, disturbances in endocrine function, focal lesions in basal structures of the brain. By understanding the evolutionary series of control levels in the central nervous system we likewise understand how the later acquired voluntary or rational facilities are the first to suffer under the influence of disease. Similarly by knowing that the visual faculty is made up of many parts which represent an evolutionary or developmental sequence, we grasp the fact that with a lesion in the angular gyrus these several qualities of vision tend to be lost in an order the reverse of that of their acquisition. The author refers to the behavior and mental states of patients suffering from encephalitis to show the organic basis of symptoms which cover nearly the whole range of psychopathology, what the individual human personality is depends upon the kind of teamwork his internal glands, his sympathetic nervous system and his midbrain are capable of.

The dramatic story of the vitamins and nutritional diseases is presented by Dr. Elmer V. McCollum, of the School of Hygiene and Public Health, Johns Hopkins University. Beginning with the experiment of Lunin (1881) by which he demonstrated that the four then known food constituents—proteins, carbohydrates, fats and mineral salts—if fed in purified form were insufficient to maintain health, McCollum sets forth the more important studies, practically confirmed within the past 25 years, through which the various specific health-maintaining constituents of food, called vitamins by Funk (1910), have been successively discovered, isolated, and in some cases

synthesized. Such nutritional diseases as beriberi, scurvy, rickets, ophthalmia, pellagra can now be dealt with effectively by appropriate dietary measures. Spectacular indeed have been the achievements of this young science of nutrition which permit the author to say: "The knowledge which we now possess concerning the nutritive needs of the body, and the properties of our more important natural and processed foods in terms of the known nutrient principles, is sufficient to enable us to cause malnutrition to disappear from the face of the earth."

In vivid antithesis to the theme of construction, maintenance and reconstruction in the story of the vitamins, stands the topic of the next and final chapter—the mystery of death, by Dr. Alexis Carrel of the Rockefeller Institute for Medical Research. Premature death, due to accident or disease, is, Carrel points out, the common one; natural death, the uncomplicated terminal event of old age, is exceptional. With the advance of medical science the number of premature deaths has progressively diminished and the average life span has been markedly extended. But insofar as social betterment is concerned, the fruits of science and the rise of humanitarianism do not constitute an unqualified blessing. "Death prevents the overcrowding of the earth. It liberates the new generations from the burden of the old. If the span of life were suddenly increased to 100 years, civilized countries could not stand the economic weight of populations composed mostly of senescent individuals. . . . . The success of our battle against death has almost suppressed natural selection. The weaklings have become artificially the equal of the strong. And civilized countries are encumbered with those who should be dead."

There is a period of apparent death following cessation of the heart action, during which resuscitation may be possible; but within a very few minutes (hardly six to eight—Crile) irreversible changes begin in the brain cells. Carrel therefore warns against efforts to resuscitate a patient belatedly. "For he might come back to life without his soul."

Carrel finds no scientific evidence to support the survival hypothesis, and the data of psychical research he finds quite unconvincing. "But no one has the right to say that such survival is impossible." He goes even further and asserts that it is not unreasonable "to believe that some part of human personality may escape death." In the same paragraph the author criticises the assumptions of the spiritists because they "neglect the fact of the existence of clairvoyance." It was necessary to go over this sentence again to make sure that it had not been misread; but there the words are in cold print—"the fact of the existence of clairvoyance." No supporting evidence is offered beyond the circumstance that mediums sometimes make startling revelations.

We have finished this compact volume which deals with varied aspects of life and health and sickness and death. The information is condensed but clearly presented, and most of the authors have said much in little space. Though designed for the laity, the student and physician will likewise find it refreshing and informing.

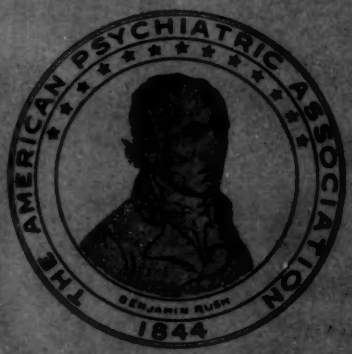
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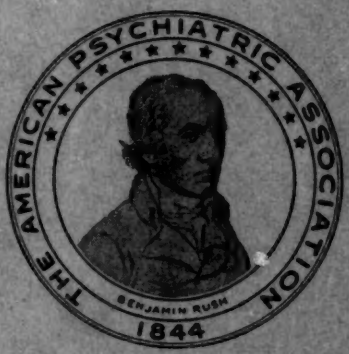
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CLINICAL STUDIES OF DRUG ADDICTION, III.

A Critical Review of the Withdrawal Treatments with Method of Evaluating Abstinence Syndromes.*

By LAWRENCE KOLB,
Medical Director, U. S. Public Health Service,
AND
C. K. HIMMELSBACH,
Passed Assistant Surgeon, U. S. Public Health Service.
U. S. Public Health Service Hospital, Lexington, Ky.

Addiction to opium, as expressed by physical dependence upon the drug and tolerance to large doses of it, is a self-limited condition that quickly disappears regardless of and in spite of what treatment is given to cure it, provided the drug is taken away from the patient; but addicts are notoriously subject to relapse, especially in a country which, like the United States, so efficiently regulates the opium traffic that comparatively few persons with normal nervous constitutions become addicted to it or remain addicted for long periods. The old unstable addicts come back for treatment time after time and this doubtless has lent weight to the idea that the addict has suffered some physical damage or change due to opium that makes his return to the use of it inevitable unless the damage can be remedied and the supposed physical craving obliterated by some form of physical therapy.

The relapse of cured drug addicts is due not only to physical dependence but to original psychic stresses, relief from which produces the seductive calm that leads in most cases to the use of opiates to the point of physical addiction; and to memory associations and habit that are built up by the practice over long periods of time of relieving mental and physical distress and pain by the use of opiates. The evaluation of these factors and the relative importance of them have been discussed in another paper.[1] It is sufficient here to state that the physical factor is of minor importance except in some cases of addiction that have lasted for years.

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

Withdrawal of the opium is all that is necessary in nervously normal addicts and it is very simple to take the drug from them, but it is clear that withdrawal therapy is the most unimportant phase in the treatment of emotionally-unstable drug addicts. Such patients must be rehabilitated mentally and emotionally if permanent cure is to be effected. We are, however, not concerned in this article with the means by which this rehabilitation is brought about.

Withdrawal therapy has attracted a great deal more attention and much is still being written about it. New treatments said to be specific are advanced from time to time and then discarded as useless or even harmful, or old treatments are revamped and presented as new. Endocrinology, immunology, and chemistry have been invoked to explain the ultimate nature of addiction and prove the virtue of certain lines of treatment. All of this, together with the fact that the treatment of physical addiction is so easy and yet so difficult and discouraging when the patient cannot be controlled, has tended to becloud the issue.

We shall not review all the literature on the subject but refer the reader to Terry and Pellens [2] for a bibliography on withdrawal therapy and extracts of the more important articles written about it up to 1928.

Treatment falls into types. Our object is to discuss the more important types and to present a method of selecting patients for research and of evaluating withdrawal symptoms that experience has shown will guard in the future against errors that have caused the acceptance of useless and even harmful treatments in the past.

Two common sources of error have contributed to the improper evaluation of methods of treatment. First, addicts with the same degree of physical habit react to the discomfort of withdrawal with widely different degrees of mental intensity. Temperamental, neurotic or cringing individuals complain bitterly of symptoms that normal persons and many psychopaths who have made up their minds to go through with the treatment, come what may, do not complain of at all. Much is made of restlessness, nervousness, pain and fear of impending collapse by patients who show none or very little of such objective manifestations as vomiting, diarrhea, tremor and insomnia; while others showing these and other objective symptoms to an intense degree may complain very little and say they are doing quite well. Second, most addicts who come in for

treatment today do not have strong habits because they have been getting an inadequate supply of adulterated drug at irregular intervals or have been deprived of their favorite drug for several days and are, therefore, almost over the withdrawal period when they are received for treatment. If investigators would take account only of objective symptoms; eliminate from studies all subjects with weak habits; use controls, and remember that with few exceptions all addicts from whom they take the drug will quickly get over the physical withdrawal symptoms regardless of what other treatment they are subjected to, fewer errors would be made.

Treatments fall into three main groups: slow withdrawal, rapid withdrawal and abrupt withdrawal. A number of specific treatments have been grafted upon the rapid and abrupt withdrawal methods. The slow withdrawal method was in almost universal use up until about 45 years ago. By this method the daily dose of opiate is gradually reduced over a period of a month or more,* using various techniques not essentially different from one another. It was the method of choice in homes and a modified form of it is still used with success in some sanitaria. After the rapid withdrawal method (withdrawal in from a few days to two weeks) was introduced much of the writing was concerned with the relative merits of it and slow withdrawal. The issue seems to have been settled against slow withdrawal, not because treatment by this method is impossible, for with proper cooperation and favorable environment the withdrawal if slow enough can be accomplished with so few symptoms that the patient is hardly aware that the opiate is being withdrawn, but because it is seldom necessary and is, as a rule, impractical. If the patient can be controlled, slow withdrawal is not necessary; if he cannot be controlled, he is likely to change his mind and discontinue treatment before it is finished, or use the treatment for several weeks merely to get opiates. Sincere

* This is purely arbitrary. Writers on drug addiction vary as to the time element of slow and rapid withdrawal. In order to avoid uncertainty as to what is meant we classify as rapid any withdrawal in two weeks or less, and as slow any withdrawal in one month or more, and consider any time between two weeks and one month as intermediate; this may be either rapid or slow depending on the severity of the habit. This intermediate period is usually regarded as slow.

addicts, who are temperamental or subject to unusual variation in moods, change their minds about the desirability of cure when slight discomfort or an attack of blues comes on. Insincere addicts start the treatment to fool their doctor or to make insistent relatives or friends believe they are sincere.

BELLADONNA TREATMENTS.

The belladonna group of drugs has been widely used in the treatment of opium addiction, and some form of belladonna treatment dominated the situation for a period of about 30 years beginning in 1901. Treatment by these drugs is absolutely useless and even harmful to addicts in withdrawal, but because so much has been written about it and articles continue to appear [3] in which such treatment is lauded, a brief review of the use of these drugs will be given. Their wide and continued use illustrates the errors that may creep into observations as to the efficacy of treatments and supports our own observation that addicts often get over the withdrawal period in spite of, rather than because of, what is done for them.

Lott [4] in 1901 first brought the hyoscine treatment forcibly to the attention of the medical profession, although drugs of the belladonna group had been used before in the treatment of addiction, but not in such a drastic manner as that employed by Lott. Petty [5] in the same year brought forth his hyoscine treatment and later on claimed the dubious honor of having been the first to introduce it.

With the patient still under the influence of morphine, Lott began his treatment by giving 1/100 grain of hyoscine hydrobromate and continued with 1/200 grain at 30-minute or 1-hour intervals for from 24 to 48 hours; the object being to produce "hyoscine intoxication." According to Lott, the patients have diarrhea but do not suffer during this period. Nevertheless, he states that they may see and imagine things that do not exist, and grow "quite wild," and he recommends that they be taken care of in a downstairs room by a strong nurse constantly at the bedside so as to prevent self-injury or injury from falls, as the patients are "incoordinate and unable to stand." Lott gave only up to three 1/4-grain doses of morphine during this period and sometimes found it necessary to give strychnine, nitroglycerine or digitalis for the heart. He states that at the end of the first delirious period the patient "no longer craves the drug and would not take it."

The second stage is then begun with the administration of 1/8 grain of pilocarpine every hour until the physiological effect is produced. Sufficient of this drug is given to maintain the effect until "the drugs that have been stored in the cord and body are eliminated." During this period and afterwards his patients suffer with diarrhea, yawning, sneezing, pains, cramps, restlessness and insomnia for which various remedies are given. After a week or 10 days appetite returns but pains, nervousness, restlessness and insomnia continue and are controlled by hot and cold baths, bromides, chloral, massage with liniments, pilocarpine, atropine, hyoscine, strychnine and electricity.

Lott offered no theory of drug addiction but the inference is gained that he thought morphine was stored in the cord and other tissues and should be eliminated in order to effect a cure. Lott's patients certainly suffered more according to his own description than patients who receive abrupt withdrawals without any drug treatment.

It is mainly due to Petty [6] that the belladonna treatment came into almost universal use in this country. Petty based his treatment on the theory that the essential pathology of addiction "is intoxication of drug, intestinal and auto-origin," and he claimed that most of the symptoms incident to the withdrawal of drugs are due to these toxins. He stated further that "at least six of the most troublesome and dangerous complicating symptoms incident to the abrupt withdrawal of opiates have their origin in . . . . deficient excretion. These are intestinal colic, nausea, vomiting, diarrhea, labored and deficient heart action and collapse." Acting on his toxemia theory he laid great stress on aiding elimination as an essential of treatment, especially elimination by the bowels. He thought that purgatives and secretory stimulants were not sufficient, in fact, they made conditions worse by causing the pouring out of secretion in the upper bowels, so "benumbed by morphine" that the secretions would not move on. According to him, nausea, vomiting, deficient heart action and collapse were caused by these secretions and an engorged portal circulation. In order to overcome this condition he used what he considered a physiologically balanced purgative compound to overcome the semi-paralyzed bowel function. The key to the Petty treatment is purgation and scopolamine and the essential of his purgation is strychnine—to stimulate

peristalsis in the "paralyzed bowels." Of this drug he gave in many cases 1/8 grain every two hours until four doses were given and he has given as much as 1/4 grain every two hours until one grain was given in eight hours. This was in addition to the strychnine in his purgative compound.

Petty took his patients off morphine in from 30 to 36 hours. He started his treatment with an elaborate system of purgation and began the administration of scopolamine about the time the morphine was discontinued. He did not make his patients wildly delirious, as did Lott, but kept them under a mild "belladonna intoxication" for from 36 to 48 hours. He continued to give purgatives during the delirious period, at the end of which, according to him, his patients began to have small bilious stools that fully cleansed the system of toxic matter. This occurred by the end of the fifth or sixth day from the beginning of treatment. Petty found it necessary, as did Lott, to give sparteine sulphate to support the heart during the active treatment or convalescence. Petty placed greater stress on the purgation which he thought overcame the toxins that are the "principal cause of suffering in these cases" than he did on the scopolamine, but he said for hyoscine (scopolamine) that it "not only occupies but fills, when properly used, as important a place in the treatment of morphinism as does chloroform or ether in the practice of surgery." According to him, it relieves pain, prevents undue nervous strain and exhaustion, arouses certain nerve centers which the opiate has blunted and produces a secondary "stimulation of the secretory and excreting organs."

A variant of the hyoscine treatment that was extensively used in this country for 25 years is one introduced by Lambert and often referred to as the Towns-Lambert Treatment.[7] It is a rapid withdrawal method in which heroic purgation and a "specific" consisting of a mixture of 2 parts of tincture of belladonna and 1 part each of fluidextract of xanthoxylum and fluidextract of hyoscyamus is given by mouth. Lambert states that this treatment brings about a real obliteration of the craving for narcotics and that under the influence of the specific the patients do not suffer from the intense diarrhea that usually accompanies the withdrawal of morphine but that energetic, drastic, cathartic medication is necessary to obtain the desired elimination. Lambert only aims to bring about a mild belladonna intoxication by the use of his specific and according to

him in from two to three days after the treatment has started his patients have a liquid green stool following a dose of castor-oil after which they often feel suddenly relaxed and comfortable.

Lambert has varied his treatment somewhat from time to time [8-10] and, depending upon indications, has used in addition to the purgatives and specific other drugs such as oxgall, phenacetin, caffeine, pyramidon, salicylates, sodium nitrate, sodium bromide, sodium bicarbonate, codeine and chloral.

Lambert's treatment was less drastic than either the Lott or Petty treatments and in his hands doubtless benefited some patients especially in view of the fact that he treated them symptomatically and used sodium bromide, sodium bicarbonate and codeine—three drugs that do have some effect in alleviating the severity of withdrawal symptoms. The belladonna specific is, however, in our experience definitely harmful and it is of interest to note that Lambert himself has changed his mind about the usefulness of the belladonna group of drugs.[11]

There are many varieties of treatment besides those given in which some member of the belladonna group of drugs is used because of its supposed specific action. Scott [12] states that "the morphinist is one who has been accustomed to preserve vagal predominance and sympathetic depression by means of his drug" and that during withdrawal "atropine secures for him the steady vagal tone which means a smooth passage to recovery." He withdrew the morphine slowly while giving small doses of atropine and administered luminal in large and increasing doses. Goods results were reported.

It is apparently true that in withdrawal there is a tremendous stimulation of sympathetic functions but the action of morphine and atropine on the vagus and sympathetic system is so complicated that the total picture of withdrawal and the action of atropine cannot be encompassed in such a simple theory. Atropine depresses the parasympathetic system and one might logically conclude from this that such depression would still further augment sympathetic predominance during withdrawal and thus make conditions worse. In any event, theory must give way to clinical observations which definitely show that this group of drugs increases the suffering of patients. The Mayor's Committee on Drug Addiction,[11] by using controls, eliminated any doubt about it.

Our own observations confirm the findings of the Mayor's committee and one may well wonder why drugs so definitely harmful to addicts during withdrawal should be considered beneficial. The "knock-out" feature of these treatments, especially Lott's and Petty's, doubtless had the effect of holding until cured many patients who would have discontinued a withdrawal treatment before being cured, and the psychological effect of doing something for patients practically all the time has a tendency, by allaying apprehension, to hold them even though what is done is harmful.

The theories advanced for the use of the belladonna group of drugs and of purgation, pilocarpine and strychnine are unsound. It is true that small doses of morphine and hyoscine antidote each other, but in morphine withdrawal we are not laboring to antidote the physiological effect of morphine but of abstinence from it. Lott gave morphine to his patients when they showed evidence of serious hyoscine poisoning, but we may ask why give a patient who is seriously ill a poison that needs to be counteracted by another poison?

As to the use of pilocarpine, all secretions of patients in withdrawal are increased because of the withdrawal and this is largely responsible for the vomiting and diarrhea as well as the sweating. A drug that increases these secretions as pilocarpine does can, therefore, only add to the distress of the patient. One reason given for the use of purgatives and pilocarpine in withdrawal treatment is that they increase the elimination of morphine. If this is true, it is a good reason for not giving them, because the organism is suffering at this time because of abstinence from, not the presence of, morphine in the body.

Treatment by strychnine, as advocated by Petty and others, is just as illogical as treatment by purgatives and pilocarpine. The patient in withdrawal is hypersensitive, restless and apprehensive, and strychnine, by increasing the acuteness of perception, aggravates these symptoms. Its use in withdrawal illustrates again that patients from whom morphine is taken get well in spite of the treatment.

The fundamental change in the human organism that brings about addiction is not known, but one thing is certain—it is not due to auto- or intestinal-intoxication, nor are the symptoms of withdrawal due to either one of these toxemias. Extreme purgation is, there-

fore, illogical. The only effect of such purgation is to devitalize the patient and increase the danger of collapse and death.

Deaths Under Treatment.

Most writers on drug addiction speak of the danger of death from withdrawal, but in a fairly comprehensive though incomplete review of the literature we find reference to only eight * actual cases.[13-16] Unreported deaths must be fairly common as we have knowledge of 11 cases. Six of these occurred in one year in a hospital where 130 patients were given the hyoscine treatment. Two received a modified Towns-Lambert treatment in which the specific and purgation were given without any morphine, it being considered in the hospital where they were treated to be more or less sinful and criminal to give morphine to an addict. One was a woman about 60 years old with a strong habit who was given abrupt withdrawal because it was thought somehow to be morally wrong to give morphine to an addict even in treatment. One, a man 62 years of age, died under abrupt withdrawal. (Information was not definite as to whether this man collapsed in a heat cabinet.) One, a man 42 years old, with a possible but unproved heart lesion, suddenly collapsed under abrupt withdrawal. Hyoscine, belladonna and purgatives undoubtedly increased the distress of eight of these patients and contributed to their deaths.

Peptization and Water Balance Treatments.

Bancroft, *et al.*[17] have proposed a theory of drug addiction and a treatment based upon it. According to them, the protein colloids of the nervous system are coagulated (agglomerated) by the morphine in chronic morphinism and these colloids may be dispersed again by a peptizing agent, the best of which, according to them, is sodium thiocyanate (sodium rhodanate). They do not use the words "peptization" and "coagulation" in the ordinary sense but state that "in the case of the nervous tissue we are probably dealing with jellies and the whole thing may well be a question of more or less

* Since writing the above, there have come to our attention three additional cases reported by Piker and Gelperin in Ann. of Int. Med. 10 (O. S., XV), 1279, 1937, and one by Obersteiner in Internat. klin. Rundschau, 1891, 5, 1840-1843; abstracted in Centralbl. f. klin. Med., 1892, 13, 524.

bound water, the former is equivalent to peptization and the latter to agglomeration" (coagulation). They state that when morphine is taken up to a certain point it is "adsorbed by the protein colloids of the nervous system causing reversible agglomeration or its equivalent, the loss of bound water. . . . . Upon withdrawal morphine leaves the tissues slowly and peptization takes place gradually, or the equivalent, more water is bound, giving rise to excitement which is manifested by withdrawal symptoms," and "in the course of time the peptizing agents normally present in the body return the nervous systems to their correct degree of disperson and the patient recovers."

Bancroft lists a number of other drugs besides morphine that are agglomerating agents and in a review of treatments of drug addiction he notes that many of these have been used and states that they are worse than useless, as they tend to aggravate an already agglomerated condition of the nervous tissues. According to him, the only treatments reviewed by him that have merit from the point of view of his theory are those that employ sodium bicarbonate, sodium bromide, ephedrine (peptizing agents) or withdrawal without drugs. Bancroft also applies his theory of the agglomeration and peptization of nervous tissue in an explanation of certain mental diseases.[18] His theory as to drug addiction may contain a clue as to the ultimate nature of it, but his experiments do not prove it. We shall not discuss the theory, however, except the practical application of it to the treatment of drug addiction by the use of sodium rhodanate.

From a perusal of the clinical histories of his cases we are forced to the conclusion that if he had used controls he would have found that those receiving sodium rhodanate suffered more than the controls. In one article [17] he cites at considerable length in support of his theory four cases treated by sodium rhodanate. Two of these cases had been taking only four grains of morphine daily for two and six years, respectively, and both of them became wildly delirious and psychotic during withdrawal under sodium rhodanate, although the morphine was not abruptly withdrawn. In one, the psychosis lasted 16 days and in the other approximately two months. Bancroft thinks that one of these patients had on admission a psychosis that was masked by the use of morphine. This case was obviously inferior, but an important point in the clinical history is that a

psychosis that was not observed on admission and became very striking under sodium rhodanate, cleared up after the sodium rhodanate was discontinued. The patient was discharged in better condition mentally than on admission.

In our experience with hundreds of cases we have not had one become psychotic during the withdrawal period but one of us has encountered two cases of 30-year addiction in which the patients became mildly hypomanic after withdrawal.[1] The development of psychosis during withdrawal is, therefore, a possibility, but nothing seems to be more unlikely than the development of two cases out of four in persons who had recently become addicts.

Bancroft does not consider the delirium and psychoses produced in his patients of any importance, but it is of interest that he quotes Borg [19] to the effect that under potassium thiocyanate four patients suffering with high blood pressure developed a toxic psychosis that lasted from five to seven days after the drug was stopped. Bancroft, however, warns against the use of potassium thiocyanate, but Borg [19] also reports psychoses produced by the sodium salt.

In addition to the psychoses, Bancroft's two patients suffered with all the usual symptoms of withdrawal including elevation of temperature, elevation of basal metabolic rate, restlessness, profuse sweating, vomiting, pains, etc., and one of them had involuntary bowel movements, a symptom which we have never observed in other forms of treatment. One of the other two cases in his series of four refused to take sodium rhodanate after the fifth day, presumably because it upset his stomach, a symptom of which all of them complained.

The remaining case, No. 1 in the series, is the only one of the four that was not made distinctly worse by the treatment. The morphine was withdrawn from this one in six days and the sodium rhodanate continued for some time afterwards. According to the description this patient had symptoms at least as severe as 50 per cent of present-day addicts who receive abrupt withdrawal, the only difference being that as treated the symptoms were more prolonged.

We have not used the sodium thiocyanate treatment for drug addicts, but Dr. Marion R. King of the U. S. Public Health Service [20] tried the drug on 10 patients and discontinued it because it invariably produced gastric discomfort accompanied by nausea and

vomiting and made no favorable impression whatever on the withdrawal symptoms. It was a common occurrence for his patients to vomit two minutes after swallowing a capsule. It is only fair to state here that King did not use recrystallized sodium rhodanate in order to insure purity as recommended by Bancroft.

Bancroft's mistaken conclusions about the value of sodium thiocyanate in the treatment of drug addicts are apparently due to unfamiliarity with the clinical picture during withdrawal. He says,[21] "The withdrawal symptoms met with upon attempting to cure drug addicts by withholding the morphine are very much like those described by Borg [19] upon prolonged administration of large amounts of sodium thiocyanate for the relief of hypertension: disorientation, hallucinations of sight and hearing, mania, confusion and ideas of persecution, singly or in combination. These symptoms are not due to the same cause because the sodium thiocyanate overpeptizes the brain colloids of the normal person." Such symptoms do not occur during the withdrawal period except when patients are given delirium-producing drugs.

Bancroft and Rutzler [21] have definitely shown that sodium thiocyanate antagonizes morphine. This doubtless explains in part why the drug is harmful during the withdrawal period as the patient is then suffering because of abstinence from morphine and he needs morphine or some similarly acting agent to reduce the severity of the symptoms.

Inadequate information as to the clinical picture during withdrawal and the effect of certain drugs upon it has caused praise of some rather remarkable treatments. Church,[14] using Macleod's "bromide sleep" treatment (120 grains sodium bromide every two hours), revived by the use of oxygen, strychnine, etc., one patient who had been brought near death by the treatment. This patient lost 18½ pounds in weight in 20 days. In our experience the average patient loses about 6 pounds during the withdrawal period and regains it by the twentieth day. Another patient who received the treatment died and Church reports two deaths out of ten patients treated by Macleod. He recognizes the danger of this form of treatment but was so favorably impressed by it that he advocated its use in well-selected cases.

Bromides in small doses do relieve to a certain extent the restlessness and insomnia from which all addicts suffer during with-

drawal, but given to the point of delirium they definitely retard recovery and are dangerous.

Adler,[22] working on Barbour's hypothesis [23] that abstinence manifestations are the result of tissue hydration, treated a number of addicts with various diuretics. She reported particularly favorable results with euphylline. We have been unable to confirm any objective value from this type of therapy. The clinical picture and blood studies have consistently indicated that anhydremia is associated with the abstinence period.

Lipoid Treatments.

The fact that opium is supposed to act upon the nervous tissues and that these tissues contain lipoids has been used by some observers to construct theories of drug addiction and treatments based upon these theories. The most widely heralded of these treatments and also the most useless and harmful is the narcosan treatment. The author of this treatment [24] states that "It is a well-established fact that the lipoids of various organs as well as of the nervous system may be extracted and consumed by the administration of narcotic alkaloids" and that the "lack of sufficient lipoids in the nervous system is responsible for the longing for drugs." He further states that "We are in a position to determine synergy of various lipoids which enables us to replace the lost lipoids of the body up to a normal point, bringing the patient into a normal condition both physically and mentally."

A treatment was invented which was said to be a solution of lipoids together with non-specific proteins and water-soluble vitamins and it was claimed that patients taking this treatment "will soon become normal and develop a contempt for the opiates which is most pronounced." [25]

Lambert and Tilney,[13] reporting on 366 cases treated by narcosan, confirmed this observation with the statement that "this substance was self-protecting against the patients indulging in narcotics on the sly." They were very favorably impressed by the narcosan treatment and stated in explanation of its action "that narcotics, such as morphine, call forth in the body certain protective substances to neutralize them. If the narcotics be suddenly withdrawn, and not given, these neutralizing substances are themselves toxic to the

body. The lipoids in narcosan neutralize these toxic substances in place of the narcotic."

Scheib,[26] reporting on 1700 cases including the 366 treated by Lambert, was so impressed that he reported results "unparalleled by any other known treatment"; while Johnson,[27] comparing the results of 24 narcosan treatments with 12 cases treated by other methods, found no benefit. The treatment excited a great deal of interest and was finally studied by the Mayor's Committee on Drug Addiction.[11] This committee, by the use of controls, found that the narcosan treatment was not only not beneficial, but it increased all the distressing symptoms of withdrawal and was positively dangerous to life. The report of this committee is of especial interest because Lambert, who had previously reported favorably on the narcosan treatment, was chairman of it. The history of the narcosan treatment illustrates very well the errors that may be made by uncontrolled observations of addicts during the withdrawal period.

Other lipoid treatments have been presented,[28] notable among them is one based on a theory advanced by Ma. Ma [29] states that the amount of lipoid material in the body cells of opium addicts is reduced almost to nil in serious addiction and when lecithin is administered orally lipoid material is gradually increased, while the craving for opium correspondingly subsides. He advances the hypothesis that by continuously administering lecithin an automatic disappearance of the opium habit and a subsequent reduction of opium tolerance might be expected. He claims experimental proof of this hypothesis.

In support of his theory that the lipoids are depleted in chronic morphinism, Ma [30] found quantitative changes in the Golgi lipoids, alterations in the nucleus and slight changes in the mitochondria in the cells of morphinized rats. MacEwen and Buchanan,[31] repeating Ma's work but using dogs, demonstrated by means of controls that there was no significant variation from the normal in any of their morphinized animals.

In 1932 Ma [32] made a lecithin feeding experiment on a group of 143 opium smokers and was favorably impressed but stated that further experimentation was necessary. In 1935 a more favorable report was issued.[29] The patients subjected to this experiment were allowed to have all the opium they wanted to smoke in the customary

manner but were required to take from 20 to 30 grams of soya-bean lecithin by mouth three times a day, after meals. It is stated that the patients receiving this treatment show a less and less desire for opium and eventually take no more of it, the time for effecting a cure varying from 4 to 22 days.

We have not experimented with this treatment but we do not feel that the experimental evidence upon which it is based is sound. There is no conclusive evidence proving that the lipoids of nervous tissue are depleted by narcotics and even if they are it is not logical to assume that the mere feeding or injection of lipoids would remedy the deficiency, especially while the narcotic is still being administered.

Endocrine Treatments.

A supposed disturbance of endocrine function due to addiction has been referred to by several authors. Some of the symptoms that the patients show during tolerance suggests that the thyroid function may be inhibited and the anxiety, general restlessness and increased metabolic rate that ensue upon withdrawal suggest thyroid overactivity. Likewise, the fact that during withdrawal the blood sugar level is always raised indicates an overactivity of the adrenals, but it is not known whether these glands are directly affected by withdrawal of morphine or whether the effect comes through a disturbance of nervous control. The sympathetic system is obviously stimulated during withdrawal and this could act as a stimulant of the adrenals with a consequent outpouring of epinephrin or the stimulation of adrenal secretion could come indirectly from an over-active thyroid gland.

The endocrine treatment that has excited most attention is that advanced by Sakel [33-35] who believes that withdrawal symptoms are caused by oversaturation of the nerves with epinephrin and a disturbance in the equilibrium of the vegetative nervous system. Insulin, according to him, eliminates signs of abstinence by re-establishing the equilibrium and he attempts to counteract the withdrawal symptoms by the use of this drug and sedatives. He begins the use of insulin as soon as withdrawal symptoms set in and administers it for from six to eight days in doses up to 80 units in 24 hours. Along with this he gives small quantities of ergot of rye and choline in order to equalize a disturbed balance in the para-sympathetic-

sympathetic system during the acute withdrawal period. He at first gave glucose with the insulin but later on discontinued it and controlled hypoglycemic manifestations by regulating the insulin dosage.

Sakel does not attempt to bring about insulin shock in morphine withdrawal and his theory of the action of insulin in this condition differs somewhat from his theory of its action in schizophrenia.[36] In the latter disease he is on somewhat more solid ground in so far as the accuracy of clinical observations is concerned.

A weak point in his theory in relation to morphine withdrawal and the effects of insulin upon it is that while epinephrin has many effects, insulin has only one—namely, the burning of carbohydrates.

Other observers treating a small number of patients with insulin [37-43] have reported favorable results, but a few have not been impressed. None used controls.

Sakel states that his patients under the insulin treatment began to gain weight in seven days. Our patients, under any form of treatment, including the controls who get no drug medication whatsoever, begin on the average to gain weight four days after the last dose of morphine.

It is extremely difficult to evaluate the effect of treatments in an explosive condition like morphine withdrawal that subsides in a few days regardless of what treatment is given for it. The only way to be sure of the action of a given remedy is to give it only to strong cases of addiction without drug medication and use controls or give the controls the same supplementary medication. Intravenous glucose or sedatives in moderation or both have been used by the various observers along with the insulin. These measures in our hands are effective without insulin. By excluding from the research cases with mild habits (80 per cent of the total) and taking account of all factors, we found that insulin had no effect on withdrawal symptoms. Insulin, of course, brings the blood sugar down but there is no reason to believe that the high blood sugar incident to withdrawal is of itself the cause of any of the symptoms. This, together with some other withdrawal phenomena, is in all probability due to an overactive sympathetic system from which an artificial check has been suddenly removed. However this may be, experience with treatments thus far has shown that time alone restores the apparently stimulated sympathetic to normal.

The ovarian hormone has also been used with reported favorable results in the treatment of drug addiction. This treatment was apparently suggested by the fact that this hormone has a chemical structure somewhat similar to that of morphine. Pettersson [44] used ovarian panhormone on two cases and thought the results justified a further trial of this remedy. He also gave pernocton, veronal, luminal and paraldehyde with the hormone. His patients suffered with restlessness, insomnia, diarrhea and distressing pains in the legs such as might be expected on the withdrawal of opium from addicts with mild habits. We have not used this treatment but are inclined to believe that the evidence so far presented about it is not encouraging.

Immunity Treatments.

Hirschlaff,[45] Geoffredi [46] and others have attempted to explain tolerance and the withdrawal symptoms along the lines of Erhlich's theory of immunity, the general idea being that morphine acts as an antigen for the production of antibodies which are poisonous and cause abstinence symptoms when the morphine is withdrawn. Pellini and Greenfield [47] and DuMez and Kolb [48] failed to find anything in the blood of addicts that increased tolerance to morphine or produced symptoms similar to the abstinence symptoms of the donor, and there is no conclusive evidence that alkaloids cause the formation of antibodies as do protein derivatives. Nevertheless, treatments which have this theory as a background have been invented and reported upon favorably.

The most important of these is Modinos' autogenous serum therapy.[49] Modinos found that blister fluid contained hydrocarbons, lipoids, oxydases, lipases and a high leucocyte count (20,000 to 80,000), and he thought it contained antibodies that had therapeutic value against withdrawal symptoms. He thought that these antibodies were more numerous in the blisters than in the blood because of an excess formation of antibodies between the layers of the skin. Acting on this theory he produced an artificial blister and after 12 to 14 hours withdrew serum from this blister and injected it under the skin in amounts of from 5 to 20 cc. Two other injections were made at intervals of four days while the opiate was gradually withdrawn. Modinos claimed that withdrawal symptoms were slight and that the patients so treated have no desire to return to the drug.

Reddish,[50] Huizenga [51] and others [52] have reported favorably on this treatment while Noordhoek Hegt [53] was not favorably impressed. Huizenga injected from 1 to 5 cc of serum each time. Two of his 10 patients refused morphine after the second injection. All of them quickly gained in weight and all of them were free from craving in from six to 14 days. Huizenga's conclusions are not convincing in view of the fact that practically all patients, regardless of the type of treatment, begin to gain weight on the fourth day after the last dose of morphine, and practically all are free of physical craving after from six to 14 days. Biggam [43] treated some of Modinos' patients who had relapsed. He tried the blister treatment on 40 cases, using controls who were treated at the same time by the application of blisters and injections, not of serum, but of a normal saline. The only effect that Biggam noticed from the blister treatment was that the blister caused considerable discomfort. The two groups showed no difference in withdrawal symptoms but both of them had considerable discomfort from the blisters.

Otterloo and Bonebakker [54] employed a method similar to Biggam's and got the same results. They point out the fallacy of Modinos' antibody theory but think that the blister treatment has suggestive value by drawing the patient's attention away from himself to the painful blister through which he is led to believe that the condition from which he is suffering is extracted. Commenting on the claim that patients treated by the blister method become sensitive to opium and are made sick by it, they correctly state that it is the usual thing for opium users to become indisposed after the first dose. The blister treatment does not differ in this respect from any other treatment.

The virtue of the Modinos treatment is supposed to lie in the antibodies contained in the serum of the blisters, but the treatment embodies probably the best treatment known for mild cases of addiction, namely, a rapid withdrawal of the opium which is given is small doses for a period of five or six days. Substitution of this treatment for definitely harmful treatments has doubtless led in some cases to erroneous conclusions as to the value of the blister serum that would not have been made if a series of controls had been treated by the reduction method without the blister.

While employing a five-day "sleep method" in which the patients were kept in a semi-sleep condition through the administra-

tion of luminal and certain hypnotics, sedatives and analgesics, Kwa and Tan [15] lost two patients out of fifty treated by them. One attendant was required for every two patients treated by this method in order to watch for signs of collapse and prevent them from injuring themselves in their "half awake" state. Even this was not successful as they often "woke up with cuts and bruises." Naturally, their opium smokers who apparently had very light habits did much better under a reduction treatment lasting from three to six days even when they were subjected to a blister or two.

C. S. Mei, Director of the Chapei Anti-Opium Hospital, Shanghai, has administered the blister treatment to over 5000 patients. He states [55] that the treatment has only a psychological value, and apparently he gives it because he feels that the patients' minds must be set at ease by giving them the idea that something tangible is being done for them. We have found this psychological factor to be very important in the treatment of drug addicts. Any form of treatment, even though it increases the severity of the objective symptoms as so many treatments do, gives them a subjective sense of relief through allaying the fear so many of them have that nothing will be done for them. Intensely apprehensive patients complain bitterly about any type of withdrawal if it is started as soon as they enter the hospital, while the same type of patients, if stabilized on morphine for a few days until they get used to the environment and find that some interest is being taken in them, may then be taken off the drug without exhibition of fear and without showing undue subjective phenomena. We have not found it necessary, however, to subject a suffering patient to the added discomfort of several blisters in order to ease his mind.

Autohaemotherapy (injection of blood previously drawn from the patient) is another treatment based upon the theory of immunity that has been reported upon favorably. Biggam [43] tried this treatment on 152 patients and found that it had no effect on withdrawal symptoms nor did it have any tendency to prevent patients from relapsing, as had been claimed by certain observers. In this treatment blood was obtained from a superficial vein and injected deep in a muscle usually in the gluteal region. Injections of from 2 to 60 cc were made daily for about seven days.

A theory [56] of morphinism advanced along with a remedy (rossium) is given by Ostromislenski. This theory makes use of im-

munity and anaphylaxis and is referred to by the author as the "Anaphylactic Theory of Morphinism." The treatment has been reported upon favorably by Raynor and Bauer,[57] and by Lambert.[58]

Ostromislenski quotes Bishop's Theory of Morphinism to the effect that " under the action of morphine, the organism of man and animals produces a special substance, an antidote " which in the free state possesses " the properties of a strong poison " and the severe symptoms of morphine withdrawal are due to the action of this substance. However, in the systems of addicts this antidote reacts with morphine becoming quite harmless and at the same time rendering the morphine harmless. He says that Bishop's theory takes care of all the facts except one, namely, that a subcutaneous injection or ingestion by mouth of a quite insignificant dose of morphine (a mere 0.0001 gram) is sufficient to produce a relapse of the disease. Ostromislenski further states[59] that " this insignificant dose may produce relapse even when complete abstinence has continued for a number of years " and the patient " has no idea that morphine has been introduced into his organism," and " if the ex-addict does not resume daily injection of the opiates he will inevitably undergo within a few days, all the severe withdrawal symptoms which he experienced during his previous treatment." [60]

Ostromislenski thinks that the withdrawal symptoms of morphinism are due to anaphylactic shock. The mechanism described by him is as follows—morphine produces antigen, the antigen produces antibodies which in the absence of morphine unite with antigen and produce shock. In support of his anaphylactic theory he states that an individual who takes morphine daily will not need morphine to prevent withdrawal symptoms until the twentieth day; in other words, addiction begins suddenly about this time. The appearance of sensitization at a definite time would fit in with the observed facts in anaphylaxis produced by an injection of protein substances.

Ostromislenski's theory is built upon three errors—namely, that the withdrawal symptoms are similar to the symptoms of anaphylactic shock; that addiction begins suddenly at a definite time; and that a minute dose of morphine given to a former addict will bring on addiction with all the withdrawal symptoms. As to the symptoms, there is nothing in morphine withdrawal that compares with the edema, urticaria, choking sensation, cyanosis, cough and difficult

breathing characteristic of anaphylactic shock in guinea pigs, nor are the symptoms comparable to those of serum accidents in man. The symptoms of anaphylactic shock are produced by the injection of a substance to which the organism is sensitive, while the symptoms of morphine withdrawal are produced by withholding the morphine and are relieved by injections of it. Addiction does not start suddenly on the twentieth day as claimed. Both clinical experience and animal experimentation show that it develops gradually. The statement that a minute dose of morphine given to a former addict will bring on addiction with all the withdrawal symptoms would, if true, be an important point in favor of the anaphylactic theory. We have shown that it is not true by giving morphine to hundreds of former addicts without in one case bringing on craving or withdrawal symptoms. However, the fact that Ostromislenski's theory is erroneous does not of itself disprove his claims about rossium.

No conclusions as to the value of rossium can be drawn from Raynor and Bauer's cases as these cases all received insulin, a reported specific for drug addiction, together with sodium amytal, intravenous glucose and codeine. Assuming, as we do, that insulin is useless, we attribute what slight favorable effect these authors observed to the intravenous glucose and codeine as we have found that both of these remedies decrease the severity of withdrawal symptoms.

In order to determine the value of rossium, Himmelsbach [61] treated four groups of patients as follows: First, abrupt withdrawal without any drug medication; second, the rossium treatment as given by Raynor and Bauer omitting the codeine and substituting ipral for the sodium amytal; third, the adjuncts to the rossium treatment as given by Raynor and Bauer omitting the codeine as well as the rossium and substituting ipral for the sodium amytal; fourth, rossium alone without any drug medication. These four groups showed exactly the same objective manifestations of withdrawal both in degree and kind, but the two groups receiving intravenous glucose had a subjective feeling of relief from some of the discomforts for about two hours after the glucose was given. The conclusion was that rossium had no value in the treatment of drug addiction.

PSYCHOTHERAPEUTIC TREATMENTS.

A conditioned reflex treatment [62] has been reported upon as giving favorable results in ameliorating the abstinence symptoms of morphine withdrawal. Only a few cases were treated by this method and the report is not convincing especially in view of the fact that the morphine was not abruptly withdrawn from the patients who were said to be conditioned. There is no reason to suppose that these severe, temporary, self-righting, organically-conditioned symptoms should be favorably influenced to an appreciable degree by psychotherapy.

Hypnotism has been tried and one author,[63] using it more with the idea of bringing about permanent cure than of relieving the severity of withdrawal symptoms, is so favorably impressed that he would force all relapsing addicts to submit to hypnotic suggestion in order that they might acquire a repulsion for drugs. He had under observation for from 9 to 35 days patients who received such treatment from him.

Two cases previously shown to be easily influenced by hypnotic suggestion with proved strong habits were treated by Dr. Victor H. Vogel, a member of the staff of the Lexington hospital.

The first case was put into a deep trance one hour after the last dose of morphine. About 12 hours later he began to mumble and groan and show other signs of restlessness but he remained asleep 11 hours longer and then awoke perspiring and complaining of back and stomach pains. He was rehypnotized and awoke again in a few minutes and it was found impossible after that to keep him asleep. Suggestions had been given to him that he would not suffer but he subsequently had the usual objective signs of withdrawal and complained a great deal although he thought that he slept better than during previous treatments.

A deep trance was induced in the second case one hour after the last injection of morphine but he awoke in 30 minutes frightened and complaining of a dead feeling in his hands and legs. He was reassured and put to sleep two more times with the same results after which the attempt to carry him through his withdrawal period by hypnosis was abandoned.

Dr. Vogel was not favorably impressed by this treatment. According to him, even if it reduces to some extent the severity of

withdrawal symptoms, it is likely to be of limited value as it requires the constant presence of the hypnotist and extremely suggestible patients.

Abrupt and Rapid Withdrawal Treatments.

The abrupt withdrawal treatment has been extensively used in prisons in recent years. It was, however, advocated by some observors as being the treatment of choice as long as 50 years ago. An advantage of the treatment is that the suffering is quickly over and the patient rapidly returns to normal. It is, however, not without danger, especially in old or debilitated persons or persons with diseased hearts. Some of the specific treatments use abrupt withdrawal, or withdrawal in from 24 to 36 hours, which amounts to practically the same thing, and the fact that the patients as a rule survive in spite of the added burden put upon them by the drugs that are given (hyoscine, narcosan) indicates that this treatment can be safely used if these drugs are omitted and care is exercised in the selection of patients for it.

Many addicts who present themselves for treatment at the present time have weak habits or are already partly cured. This condition has prevailed for a number of years and is growing more evident as time goes on because it is becoming increasingly difficult to secure undiluted drugs illegally and physicians are growing more and more reluctant to furnish narcotics to addicts even when they might consider the cases to be worthy. We find, as a result of this state of affairs, that only about 20 per cent of addicts have sufficiently strong habits when they come in for treatment to justify their inclusion in a research program designed to test the efficacy of cures. These weak habit cases do well under abrupt withdrawal combined with certain supportive measures—sedatives in moderation, baths, etc., and perhaps an occasional dose of codeine for two or three days. This, we believe, is the treatment of choice for such patients provided the heart is in good condition. For addicts with strong habits abrupt withdrawal is cruel, dangerous and unnecessary. Such treatment is often given in prisons and sometimes in hospitals because of a feeling that the addict does not deserve anything better. This, of course, goes along with a generally hostile attitude towards the addict that is bad psychologically and lays the ground work for relapse.

The Mayor's Committee on Drug Addiction [11] found that patients suffered less under rapid withdrawal than under any other form of treatment tried by them. In a seven-day withdrawal the patients, after being stabilized on morphine had one-seventh of this amount withdrawn each day for seven days; in a fourteen-day withdrawal the patients, after being stabilized, had one-fourteenth of the amount withdrawn each day; in a codeine-morphine withdrawal the morphine was rapidly withdrawn in four days while codeine was given in five-grain doses three times daily, alternating with injections of morphine. On the fifth day five-grain doses of codeine were given every four hours and the dose gradually decreased until on the seventh and last day of the treatment a total of only six grains was given. There was less suffering under the seven-day codeine-morphine withdrawal than under the morphine alone, and still less under the fourteen-day morphine withdrawal. It was found, however, that a prolongation of the treatment caused some trouble because the suffering, though less intense, was more prolonged.

The method of choice in our experience is a rapid withdrawal except for those patients who have weak habits and come in partially cured because they have already been deprived of the drug for several days. A few doses of codeine given to such patients over a period of two or three days, is all that is necessary and it is surprising how little they suffer.

Many patients are extremely apprehensive of treatment. They expect to suffer more than they actually do and some of them fear death. It is, therefore, desirable to stabilize all patients with strong habits and some of those with weak ones on a few grains of morphine a day, usually not more than four, until they get used to the environment and grow to feel that they are not going to be treated with brutal indifference as so many of them have been treated before. It is surprising how such patients calm down under this preliminary treatment and go through the withdrawal period, even if it is abrupt, without fear and often without complaint. After the patients have been stabilized we withdraw them, depending upon the indications, in from four to ten days using codeine or morphine or both drugs in small doses. It is desirable to give enough to take the edge off the suffering and prevent collapse and we believe as to the latter that no healthy person who receives as

much as three grains of morphine in small doses between the 24th and 96th hour of the withdrawal period will die from the withdrawal regardless of the length of habit or amount of drugs he has been taking, provided he is not given toxic doses of other drugs or subjected to debilitating physical therapy.

Along with the withdrawal the patients are given as many as three ten-minute warm baths during the day. We find that these baths decrease the restlessness. Patients who do not eat well are given 1,000 cc of five per cent intravenous glucose as often as three times per day. These infusions reduce the weight loss, probably by maintaining water balance, and also give a subjective sense of relief from the restlessness for about two hours. Diarrhea is controlled by five grains of bismuth subcarbonate three times daily when necessary. If at the beginning of treatment the patient is constipated an enema is given. Extensive purgation is never used. The Mayor's Committee [11] treated patients by the use of hypnotics, sedatives and analgesics and found that none of them gave any obvious advantage over abrupt withdrawal, and some made the patients worse. This is doubtless true in the main when patients are given large doses of these drugs, but an occasional dose of any of them, especially at night, will be beneficial by promoting sleep. We prefer paraldehyde for this, giving from 12 to 20 cc in olive-oil by rectum. We have also found that sodium bromide given in from 15 to 45-grain doses three times daily with 30-grain doses of sodium bicarbonate for four or five days reduces the restlessness of the patient without producing any harmful effects. We carefully watch patients receiving bromides so that the drug can be discontinued if evidence of toxicity appears.

Comment.

We have shown that all treatments based on theories of the mechanism of drug addiction have been failures. The mechanism remains obscure and we have no theory about it but offer the following as a partial explanation, not of the mechanism but of some of the withdrawal phenomena that depend upon the disorganization of it: the functions of the sympathetic nervous system are depressed by morphine. In chronic users there is a reaction against this depression that tends to restore the functions to normal. This functional reaction increases as the dose of morphine is increased

(increased tolerance). When the morphine is withdrawn the reactive mechanism designed to counteract poisonous doses of it continues to work for some time. This causes powerful stimulation of certain functions under the control of the sympathetic—hence, the sweating, goose-flesh, increased secretions causing vomiting and diarrhea, increased blood sugar from increased outpouring of adrenalin, raised blood pressure, etc. The fact that this reactive phenomenon is peculiar to addiction to opiates argues for the condition of dependence rather than mere tolerance. There is also an apparent thyroid overactivity due to overaction of a previously depressed thyroid. But removal of the check from the sympathetic and thyroid obviously does not explain the whole picture. The entire central nervous system apparently reacts in the same way as the sympathetic; therefore, in withdrawal, more intense perceptions are received by centers that are more sensitive to them. Hence, the insomnia, pain, restlessness, anxiety, etc. The universality of the reaction in the nervous system probably explains why drugs specifically acting upon one part of it are not generally beneficial.

It has been shown that many serious investigators and clinicians have made errors in clinical observations of withdrawal symptoms of opium addiction due mostly to the fact that they have not taken into account the numerous variable factors that enter into the study of any series of cases. As a result of these errors useless and even harmful treatments to control or mitigate the severity of the symptoms have been widely used. In order that such errors may be avoided in the future we have studied under controlled conditions in a group of addicts the abstinence syndrome with the purpose of increasing our knowledge of the phenomena of deprivation and of providing an impersonal, purely quantitative method of abstinence evaluation which would give accurate estimates of the daily intensities of abstinence and yet be sufficiently simple to permit of wide usage in the clinical testing of withdrawal therapy.

To insure uniformity in withdrawal phenomena we consider it important that patients used to evaluate treatments should have not only proved strong habits but that before being withdrawn they should be stabilized within a certain close range as to daily dosage. The patients forming this study were stabliized on from 240 to 340 mgs. of morphine per day.

Methods of Study of the Abstinence Syndrome.

Sixty-five addicts were studied during the last week of satisfied dependence and the first ten days following abrupt withdrawal. The presence of pre-established strong dependence was demonstrated in all these cases prior to the initiation of study. All of these patients were studied under the same experimental conditions. Thirty-five of these cases received medication following withdrawal which has been shown in no way to affect the objective abstinence phenomena. This group consists, therefore, of 65 addicts with proved dependence from whom narcotics were abruptly withheld and who subsequently exhibited characteristic deprivation phenomena which were not perceptibly modified in intensity or extent by any of the therapeutic measures administered at this time.

For the purpose of elucidating and measuring the abstinence syndrome, data were obtained daily during the last week of addiction and the first 10 days of abstinence on the following accurately measurable signs: Rectal temperature, respiratory rate, blood pressure, basal metabolic rate, blood sugar, caloric intake, weight, and sleep. Measures of rectal temperature and respiratory rate were made three times daily. Blood pressure determinations were made at the same time each morning before breakfast with the patient in the supine position. Basal metabolic rate determinations were made on patients in the post-absorptive state after 45 minutes of observed rest in bed. Blood sugar determinations were made on samples of venous blood drawn at the same time each morning before breakfast. Caloric intake was estimated by obtaining the weight of all foods consumed (amount served less the remainder) and the use of standard tables giving the caloric values of various foods. Weight, stripped, was determined at the same time each morning on a " silk scale " accurate to 10 gm. Sleep was estimated by observations made at half-hourly intervals throughout the entire period of study. Observations for the presence of the non-accurately measurable signs of abstinence were made three times daily throughout the entire period of study.

The data obtained were subjected to the following statistical treatment for the purpose of determining the significance of abstinence deviations from addiction levels. Addiction means were determined for each of the accurately measurable signs in every case. The *group* addiction means are the means of the *case* addic-

tion means. The group addiction means were then compared with the group means for each day of addiction and abstinence through the use of critical ratios. Critical ratios of three or more are considered to indicate statistically significant differences. The complete data are presented in Tables * I to X. The daily abstinence means were plotted graphically by using the respective addiction means, except for weight, as the ordinate base lines. Abstinence weight deviations were plotted from the last day of addiction because of the consistent gain in body weight during the stabilization period. These graphs, presented in Fig. 1, show the direction and extent of the daily abstinence deviations, and whether the differences between the addiction and daily abstinence means are statistically significant. These graphs were prepared in such a manner that the maximum deviations, in each measure, are of about the same ordinate extent. The abscissae intervals indicate days following withdrawal, and are equal in all graphs.

A Quantitative Method for Estimating Objective Abstinence Syndrome Intensity.

The desirability of a simple, impersonal, quantitative method for estimating the intensity of the composite abstinence syndrome has been discussed in a previous report.[61] It is felt that the method to be described meets these requirements satisfactorily, since its scope is sufficiently broad to include the prominent effects of withdrawal, and since the measures involved are limited to common hospital procedures. The use of this method requires adherence to a program best suited to this type of investigation. The program outlined below is felt to meet the research requirements of the withdrawal treatment problem, and to be adaptable to most institutions:

1. Hospitalization and segregation of the patients to be studied are necessary in order to control all of the factors which might influence the study. Prevention of the introduction of narcotics is essential.

2. Demonstration of the presence of definite physical dependence in all patients on whom withdrawal treatment studies are to be made is essential to the validity of the studies. This is accomplished by withholding narcotics

* The complete data in Tables II to X are not given here. A composite result of these tables showing the means, standard deviation, standard error, standard error of the difference and the critical ratio are given. The complete tables will be furnished by the authors upon request.

until the deprivation phenomena set in and reach a marked intensity. Most patients will understand that it is necessary to establish a diagnosis before instituting treatment and will submit to a 24 to 30-hour period of abstinence for diagnostic purposes.

3. A stabilization period of at least one week prior to the withdrawal of all narcotics and the beginning of the treatment to be evaluated is desirable. During this time the dependence requirement is met by the administration of the minimum amount of morphine, or one of its derivatives, necessary to prevent appearance of objective evidence of abstinence. It has been found that equal doses of morphine administered subcutaneously at 6 a. m., 11 a. m., 5 p. m. and 10 p. m. satisfy dependence satisfactorily no matter what drug, route, or interval the patient had been accustomed to prior to admission. The actual requirement is usually much less than the patient thinks, but must be ascertained by trial.

4. Narcotics should be withdrawn abruptly and the last dose should be given at the same hour in all cases. In this study, the last doses were always given at 10 p. m. It is not advisable to start withdrawal of many cases at the same time. We believe that it is better to start the withdrawals separately at not less than two-day intervals, since this facilitates more thorough observation and treatment of the individual case, and affords the others the opportunity to observe for themselves that the abstinence syndrome is not so severe as they had imagined.

5. Control cases receiving no treatment should be studied at regular intervals.

6. The presence or absence of the following non-accurately measurable signs of abstinence, to a significant extent, should be recorded three times daily throughout the entire period of study:

Yawning.	Anorexia.*	Goose-flesh.
Lacrimation.	Dilated pupils.	Restlessness.
Rhinorrhea.	Tremor.	Emesis.
Perspiration.		

Formal examinations for these signs should be made three times daily at 6 a. m., 2 p. m. and 7 p. m. Rectal temperature and respiratory rate should be measured at the same times. Blood pressure (supine position), and weight (stripped) should be measured at the 6 a. m. observation.

7. From the accurately-measurable and non-accurately measurable signs the daily intensity of abstinence is determined in the following manner:

Abstinence fever, hyperpnoea, and elevation of systolic blood pressure are scored on increases over their respective addiction means. Temperature and respiratory rate values for each day are the averages of the three daily determinations. Weight loss is measured from the last day of addiction. The

*Anorexia may be scored either when the total caloric intake for a day is 40 per cent less than the addiction mean, or as a *poor* appetite when appetite is estimated as good, fair, poor, or none.

following numerical values have been assigned to the signs of abstinence observed and measured:

The scores for accurately measurable signs of abstinence are as follows:

Fever: 1 point for each 0.1° C. (rectal) rise.

Hyperpnœa: 1 point for each respiration per minute increase.

Systolic B/P: 1 point for each 2 mm. Hg. rise (up to 30 mm.).

Weight: 1 point for each pound loss (or 2.2 points for each Kgm.).

The scores for the non-accurately measurable signs of abstinence are as follows:

Yawning, Lacrimation, Rhinorrhea, Perspiration ..... 1 point only for any of these signs observed on any one day.

Anorexia, Goose-flesh, Dilated pupils, Tremor ..... 3 points only for any of these signs observed on any one day.

Restlessness ..... 5 points only in one day.

Emesis ..... 5 points for each emesis observed.

The score for any 24-hour day is the sum of these points.

Results and Discussion of Quantitative Method.

The composite intensity of the abstinence syndrome exhibited by the 65 cases studied has been scored by both the quantitative method outlined above and by the method of estimated degree described in previous reports.[64-66] Comparisons of these methods are made in Table I and in Fig. 1 (intensity of abstinence syndrome). It will be seen that the quantitative point method corresponds quite closely to the method of estimated degree through the fifth day of abstinence, and that it shows recovery to be slower thereafter.

Following withdrawal significant changes (Fig. 1 and Tables * II to X) in caloric intake, blood sugar, rectal temperature, respiratory rate, blood pressure, basal metabolic rate, and sleep took place. Changes in blood sugar and caloric intake were not statistically significant after the fourth and sixth days of abstinence, respectively. Changes in body weight were not statistically significant. The rest of the measures studied showed significant changes through the tenth day of abstinence.

* See note on page 786.

Following the abrupt withdrawal of morphine and its addictive derivatives from addicts who have acquired physical dependence there occurs a very characteristic group of signs and symptoms

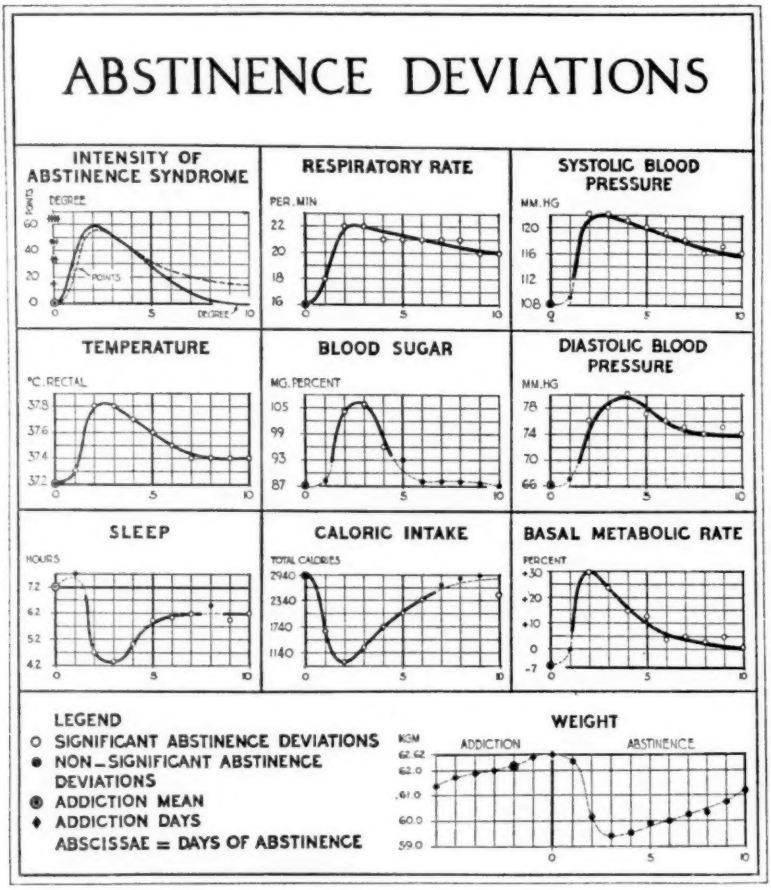


FIG. 1.

which have been termed the " abstinence syndrome." Many of the signs of abstinence represent measurable deviations from addiction levels. The addiction levels are within normal limits, but may or may not represent the individual normal levels. Most of the measurable abstinence deviations are statistically significant for at least

TABLE I

DAILY INTENSITY OF ABSTINENCE

Case No.	Estimated Degree										Points									
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
1	2	4	3	2	2	2	1	..	..	..	19	59	52	48	39	35	26	..	..	..
2	2	3	2	1	1	1	1	0	0	0	25	45	39	27	24	24	18	14	16	12
3	2	4	3	3	2	1	1	0	..	..	19	72	43	38	30	24	20	15	..	..
4	3	4	3	2	1	0	0	0	..	..	24	64	42	38	22	18	20	22	..	..
5	2	4	3	2	1	1	..	..	..	..	28	51	49	39	25	32	..	..	..	..
6	2	3	4	4	3	2	2	1	..	..	28	35	38	51	35	30	25	30	..	..
7	4	4	3	2	1	1	0	0	0	0	54	73	49	35	16	17	18	13	13	1
8	3	4	3	3	2	2	1	1	..	..	20	64	43	56	42	40	29	25	..	..
9	2	3	4	3	2	1	1	..	..	..	14	35	59	43	37	21	16	..	..	..
10	2	4	4	3	2	2	1	1	1	0	19	47	71	48	36	34	36	22	21	2
11	2	3	3	2	2	1	1	0	0	0	23	48	51	40	28	22	20	18	20	2
12	1	3	4	2	1	1	0	0	0	0	13	47	49	31	17	18	6	7	14	1
13	2	4	4	3	1	1	0	0	0	0	23	60	56	42	22	9	8	9	13	
14	2	4	3	3	2	2	1	1	1	0	16	61	48	45	42	40	35	30	28	2
15	2	4	3	2	1	1	0	0	0	0	12	41	39	33	27	15	21	17	22	1
16	2	4	3	2	1	1	1	0	0	0	22	58	37	36	21	21	20	15	12	1
17	3	4	3	2	2	1	1	0	0	0	31	69	50	35	30	20	16	15	22	1
18	2	3	3	2	1	1	0	0	0	0	24	48	42	21	18	12	12	12	5	
19	2	4	4	3	2	1	1	1	0	0	23	53	70	35	25	24	20	14	16	1
20	2	3	3	3	3	2	1	0	0	0	16	44	54	46	52	35	27	24	17	2
21	1	4	4	3	2	1	1	0	0	0	17	74	76	52	36	31	23	11	13	2
22	2	3	2	1	0	0	0	0	0	0	20	29	30	30	19	18	11	17	8	
23	2	4	4	3	2	1	..	..	..	..	27	53	48	41	34	26	..	..	..	..
24	2	4	3	2	1	0	0	0	0	0	26	48	42	27	13	10	11	8	7	1
25	2	4	4	3	2	1	1	1	0	0	29	114	82	52	48	38	34	32	27	2
26	2	4	4	3	3	2	1	0	0	0	19	52	63	51	40	30	26	20	18	1
27	2	3	2	1	0	0	0	0	0	0	23	44	20	15	8	12	9	6	5	
28	2	4	3	2	1	0	0	0	0	0	19	50	53	32	24	18	19	12	11	
29	2	4	3	3	2	1	0	0	0	0	25	60	36	42	29	20	10	13	17	1
30	2	4	4	2	1	0	0	0	0	0	14	55	57	42	31	20	17	16	16	1
31	2	3	3	2	1	1	0	0	0	0	13	41	40	38	32	23	19	24	17	1
32	2	3	4	4	3	2	1	0	0	0	20	52	61	59	33	28	25	17	20	1
33	2	4	4	3	2	1	0	0	0	0	23	87	72	44	43	34	29	25	22	2
34	1	2	2	2	1	0	0	0	0	0	15	24	30	25	22	14	12	7	2	
35	3	4	4	3	2	1	..	..	..	..	28	75	76	56	37	28	..	..	..	..
36	3	4	4	3	2	1	1	0	0	0	38	49	111	69	56	37	36	25	26	2
37	2	3	4	3	2	1	1	0	0	0	21	46	52	46	36	26	23	24	24	1
38	1	3	3	2	2	2	1	1	0	0	15	37	36	23	18	27	17	20	17	2
39	2	4	4	4	2	1	1	0	0	0	26	68	52	53	33	23	29	27	20	1
40	3	4	4	3	2	1	..	..	..	..	42	72	65	33	25	16	..	..	..	..
41	3	4	3	2	1	1	0	0	0	0	31	36	27	19	13	7	6	4	9	
42	2	4	4	4	2	1	0	0	0	0	23	62	69	59	46	34	27	17	16	1
43	4	4	4	3	3	2	1	1	0	0	68	111	62	51	52	49	47	29	23	2
44	3	4	4	3	3	2	1	0	0	0	15	58	71	53	47	28	29	18	16	1
45	1	4	4	3	2	1	1	0	0	0	3	64	53	36	28	30	18	20	19	3
46	1	4	3	2	1	..	..	..	..	..	9	63	38	33	..	..	..	..	..	..
47	1	4	3	3	2	1	0	..	..	..	9	47	49	41	26	27	16	..	..	..
48	3	4	3	2	1	1	0	..	..	..	34	80	33	26	15	19	9	..	..	..
49	1	3	2	1	1	1	0	0	0	0	12	35	32	22	13	17	14	11	8	
50	1	3	2	1	0	0	0	0	0	0	5	31	29	18	13	14	8	8	3	
51	2	3	3	2	1	1	0	0	0	0	26	39	40	35	18	16	15	13	13	
52	1	4	3	2	2	1	1	0	0	0	16	47	50	37	27	33	23	31	29	1
53	2	3	3	3	2	1	0	0	0	0	19	42	42	42	29	18	11	13	7	
54	2	4	3	2	2	1	0	0	0	0	22	63	41	27	34	19	13	18	19	
55	2	3	3	2	1	0	0	0	0	0	12	45	39	29	21	22	19	15	17	1
56	2	4	3	2	1	1	0	0	0	0	11	47	50	15	14	13	19	12	15	1
57	2	3	2	1	1	0	0	0	0	0	18	24	29	14	18	13	18	10	2	
58	1	3	4	3	2	1	..	..	..	..	9	38	44	47	26	20	..	..	..	..
59	1	4	3	2	1	1	0	0	0	0	7	73	44	42	30	26	26	21	30	2
60	1	4	4	3	3	2	1	0	0	0	6	82	72	47	42	32	28	23	23	2
61	2	3	3	2	2	1	0	0	0	0	26	46	43	31	33	31	37	30	27	2
62	1	4	4	3	3	2	1	0	0	0	15	117	106	57	46	33	24	25	25	1
63	2	4	4	4	3	2	1	0	0	0	24	108	73	55	32	18	20	24	21	1
64	2	4	3	2	1	0	0	0	0	0	27	40	36	26	24	17	9	8	9	1
65	2	4	4	3	2	1	1	0	0	0	28	64	76	42	30	21	20	15	14	1
Mean	2.0	3.6	3.3	2.5	1.7	1.0	0.5	0.1	0.0	0.0	21	56	51	39	29	24	20	18	16	1
σ (Dis)	.690	.511	.630	.765	.765	.630	.533	.360	.040	0.0	10.1	20.0	17.4	12.1	10.9	8.7	8.7	7.2	7.0	6.
σ (Av)	.0856	.0633	.0781	.0949	.0949	.0787	.0694	.0485	.0056	0	1.2	2.5	2.1	1.5	1.4	1.1	1.1	1.0	1.0	1.

COMPOSITE RESULTS OF DATA, TABLES II-X

TABLE II

RESPIRATORY RATE

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	16.9	16.8	16.5	16.4	16.0	16.1	15.9	16	18	22	22	21	21	21	21	21	20	20
σ (Dis)	2.5	2.4	2.3	2.1	2.0	2.1	2.2	1.89	2.40	3.68	3.41	3.45	2.87	2.75	2.97	2.78	2.47	2.41
σ (Av)	0.32	0.30	0.28	0.26	0.25	0.26	0.27	0.23	0.30	0.45	0.42	0.43	0.34	0.34	0.38	0.37	0.35	0.34
σ (Diff)	0.39	0.38	0.36	0.35	0.33	0.35	0.35		0.38	0.51	0.48	0.48	0.43	0.41	0.44	0.44	0.41	0.41
Critical Ratio	2.31	2.11	1.39	1.14	0	0.28	0.28		5.26	11.76	12.50	10.42	11.69	12.19	11.36	11.36	9.76	9.76

TABLE III

SYSTOLIC BLOOD PRESSURE

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	109	108	108	107	107	108	106	108	109	122	122	121	120	119	118	116	117	116
σ (Dis)	9.36	9.12	9.56	8.03	8.29	7.39	8.99	7.12	9.02	13.69	13.88	14.80	14.75	12.45	12.34	11.25	11.41	10.61
σ (Av)	1.22	1.15	1.19	1.00	1.03	0.92	1.12	0.88	1.14	1.70	1.72	1.85	1.83	1.56	1.55	1.48	1.54	1.48
σ (Diff)	1.50	1.45	1.48	1.33	1.35	1.27	1.42		1.44	1.91	1.93	2.04	2.03	1.79	1.78	1.72	1.77	1.72
Critical Ratio	0.67	0	0	0.75	0.74	0	1.41		0.69	7.93	7.33	6.37	5.91	6.15	5.62	4.65	5.08	4.65

TABLE IV

RECTAL TEMPERATURE

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.3	37.8	37.8	37.7	37.6	37.5	37.4	37.4	37.4	37.4
σ (Dis)	0.222	0.215	0.214	0.174	0.201	0.168	0.154	0.0213	0.21	0.32	0.32	0.31	0.29	0.27	0.27	0.21	0.19	0.19
σ (Av)	0.028	0.027	0.026	0.021	0.025	0.021	0.019	0.003	0.026	0.040	0.040	0.038	0.038	0.034	0.035	0.028	0.026	0.027
σ (Diff)	0.028	0.027	0.026	0.021	0.025	0.021	0.019		0.027	0.040	0.040	0.040	0.040	0.034	0.034	0.028	0.027	0.027
Critical Ratio	0	0	0	0	0	0	0		3.70	15.00	15.00	12.50	10.00	8.82	5.88	7.14	7.41	7.41

TABLE V

BLOOD SUGAR

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	85.5	86.4	86.3	86.6	86.9	87.4	86.1	87.0	87.8	104.1	105.7	95.6	93.2	88.0	88.0	87.9	87.5	86.8
σ (Dis)	7.26	8.47	8.74	8.08	8.05	7.62	8.21	7.71	8.57	16.37	13.43	12.24	10.08	8.91	9.07	7.76	9.35	8.50
σ (Av)	1.37	1.47	1.46	1.35	1.32	1.25	1.35	1.27	1.56	2.76	2.45	2.04	1.81	1.63	1.60	1.49	1.77	1.48
σ (Diff)	1.87	1.94	1.93	1.85	1.83	1.78	1.85		2.01	3.04	2.76	2.40	2.21	2.07	2.04	1.96	2.18	1.95
Critical Ratio	0.80	0.31	0.36	0.22	0.05	0.22	0.49		0.40	5.62	6.78	3.58	2.80	0.48	0.49	0.46	0.23	0.10

TABLE VI
Diastolic Blood Pressure

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	67	66	66	66	66	66	66	66	67	76	78	80	77	76	75	74	75	74
σ (Dis)	10.5	9.8	8.5	8.2	8.7	7.5	8.2	7.29	9.80	10.50	10.50	10.80	11.10	10.80	10.70	10.60	10.60	10.66
σ (Av)	1.35	1.22	1.05	1.02	1.08	0.93	1.02	0.90	1.20	1.30	1.29	1.35	1.38	1.35	1.35	1.39	1.43	1.48
σ (Diff)	1.62	1.52	1.38	1.36	1.41	1.29	1.36		1.50	1.58	1.57	1.62	1.65	1.62	1.62	1.66	1.69	1.73
Critical Ratio	0.62	0	0	0	0	0	0		0.67	6.33	7.64	8.64	6.67	6.17	5.56	4.82	5.32	4.62

TABLE VII
Sleep

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	7.20	7.10	7.34	7.12	7.39	7.28	7.24	7.22	7.72	4.73	4.37	5.00	5.89	6.00	6.14	6.48	5.95	6.18
σ (Dis)	1.50	1.60	1.77	1.45	1.65	1.53	1.45	1.09	1.95	2.64	2.02	2.20	2.05	1.87	2.06	1.79	1.58	2.21
σ (Av)	0.20	0.20	0.22	0.18	0.21	0.19	0.18	0.13	0.24	0.33	0.25	0.27	0.26	0.23	0.27	0.24	0.22	0.31
σ (Diff)	0.25	0.25	0.27	0.23	0.25	0.25	0.23		0.27	0.36	0.28	0.30	0.29	0.26	0.30	0.27	0.26	0.34
Critical Ratio	0.08	0.48	0.44	0.43	0.68	0.24	0.09		1.83	7.01	10.11	7.41	4.57	4.62	3.61	2.71	4.97	3.09

TABLE VIII
Caloric Intake

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	2870	2930	2940	2900	3010	2980	2980	2940	1640	920	1260	1740	2070	2360	2720	2880	2940	2480
σ (Dis)	653.9	649.9	659.6	636.9	681.3	584.2	657.6	515.3	785.7	673.7	759.2	912.7	1012.3	996.3	852.4	839.5	921.5	981.2
σ (Av)	83.8	82.3	82.4	79.6	85.2	73.0	82.2	64.4	98.2	84.2	94.9	114.1	128.1	126.1	113.7	113.4	130.3	140.2
σ (Diff)	105.7	104.5	104.6	102.4	106.8	97.3	104.4		117.4	106.0	114.7	131.0	143.4	141.6	130.6	130.4	145.3	154.2
Critical Ratio	0.66	0.09	0	0.39	0.65	0.41	0.38		11.07	19.06	14.65	9.16	6.07	4.10	1.68	0.996	0	2.98

TABLE IX
Basal Metabolic Rate

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	..	..	−7.1	−8.1	−6.4	−8.7	−6.8	−7.05	−1.0	+28.7	+22.8	+14.2	+12.0	+3.2	+3.8	+2.2	+3.7	−0.2
σ (Dis)	..	..	8.10	8.73	7.79	8.11	8.92	7.61	9.80	21.54	13.66	8.97	7.42	6.90	7.92	7.12	5.40	6.97
σ (Av)	..	..	1.56	1.52	1.28	1.28	1.41	1.202	2.08	3.64	2.85	1.49	1.66	1.16	3.22	1.26	2.70	1.19
σ (Diff)	..	..	1.68	1.65	1.40	1.43	1.55	..	2.40	3.83	3.09	1.90	2.05	1.67	3.44	1.74	2.95	1.69
Critical Ratio	..	..	0.24	0.36	0.79	0.84	0.45	..	2.52	9.34	9.66	11.12	9.29	6.14	3.15	5.32	3.64	4.05

TABLE X
Weight

	Addiction (Day)							Group Mean	Abstinence (Day)									
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	8	9	10
Mean	61.37	61.71	61.85	61.98	62.14	62.49	62.62	..	62.36	60.17	59.40	59.56	59.87	59.97	60.24	60.36	60.75	61.19
σ (Dis)	8.47	8.21	8.25	8.40	8.51	8.63	8.63	..	8.51	8.53	8.37	8.40	8.36	8.38	8.40	8.31	8.26	8.70
σ (Av)	1.10	1.03	1.03	1.05	1.07	1.07	1.07	..	1.06	1.06	1.04	1.04	1.04	1.05	1.05	1.09	1.11	1.22
σ (Diff)	1.53	1.48	1.48	1.50	1.51	1.51	..	..	1.50	1.50	1.49	1.49	1.49	1.50	1.50	1.53	1.54	1.62
Critical Ratio	0.81	0.55	0.52	0.41	0.32	0.09	..	..	.1733	1.633	2.161	2.054	1.846	1.767	1.587	1.478	1.214	.8827

10 days after withdrawal. Whether this indicates the assumption of new levels or incomplete physical recovery cannot be determined by this study, but we believe that recovery is not complete in 10 days.

The change in body weight which takes place following withdrawal would seem to be statistically non-significant since the critical ratios are all below three. The reason for this is felt to be that body weight is the only one of the measures studied which showed wide individual variation, and hence gave relatively large standard deviations. All of the cases lost weight following withdrawal.

Summary and Conclusions.

Types of treatments of the abstinence syndrome of opiate addiction are presented and discussed.

No adequate theory of the ultimate nature of opiate addiction has been presented and treatments based on theories have been failures.

Tolerance to opium and physical dependence upon it are self-limited and quickly disappear when the opium is withdrawn regardless of what treatment is given for it.

Sudden or too rapid withdrawal may cause death but unwise treatments have contributed to most withdrawal deaths.

The treatment of choice for patients with strong habits, based on present knowledge, is rapid withdrawal, in 14 days or less, supplemented by certain supportive measures.

Patients with mild habits respond very well to abrupt withdrawal, together with a few small doses of codeine and supportive measures.

About 80 per cent of addicts of the present day have such mild habits that they are unsuitable for testing the value of treatments.

The intensity of withdrawal symptoms varies in addicts with the same degree of tolerance.

Only objective symptoms of abstinence are valuable in measuring the intensity of the symptoms.

A quantitative system for measuring abstinence is presented based on accurately-measurable and non-accurately measurable objective signs.

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DISCUSSION.

DR. WALTER BROMBERG (New York).—I wish to congratulate the authors of this paper on their entrance into a field where the hope of therapy often outruns the achievements, and to congratulate them on the critical attitude which they have taken in this difficult field.

Our experience at the Psychiatric Clinic at the Court of General Sessions does not include the treatment of addicts. Treatment is carried out in the city prison where the rapid withdrawal method is used, and we see the individuals after they have been cured, prior to their sentence and we have opportunity to study their personality, our chief function in this particular group.

I was struck in reading the manuscript of Dr. Kolb's and Dr. Himmelsbach's paper on their noting the psychological effect of treatments of various kinds. I have often been struck by the recurrence of drug addicts in individuals who go to penintentiaries after their release. Many of our repeaters tell us that within six hours of their release from the penitentiary, they are back in the habit; some wait a few days or a month longer. Perhaps part of this is due to the conception of a socialist attitude on the part of physicians, penitentiary wardens, and so forth, in the treatment of drug addicts. The drug addict feels socially rejected, and perhaps rightly, the drug addict is looked upon as an evidence of social deterioration. The prisoner, then, is able to expatiate his guilt by receiving this severe treatment. He feels, having been punished by society, both in the way of social attitudes about drug addiction and in the technique of the drastic treatment, that he is able to go forth and resume his habit. Too little is known about the psychology of drug addiction as far as I have been able to find out.

The types of cases we deal with are those of the lower strata of society, but one knows little about the reactions in the offender himself from contact with drastic types of treatment.

The very interesting and important point in the author's paper which Dr. Kolb did not bring out is that of bringing quantitative standards to the measurement and valuation of subjective data. Physicians are in the habit

of judging treatments and the success of treatments by their objective findings and by subjective impressions which patients or offenders give them.

As I read the original charts and saw the data on which these graphs were based, I was able to see an important point of departure which the Doctor has brought out. They use this statistical method which rules out the probabilities of contingency between several factors. They, for example, plotted out the chance relationship of things like increase in weight or decrease in weight, increase or decrease of sugar in the blood, and so forth. In this way, there is a check on the rather large amount of credulity which all physicians must acknowledge in the judgment of success of any given type of treatment.

This attempt to check clinical judgment by the success of treatment is important, particularly in the field in which I am interested, namely, psychiatric criminology, because we have not only the subjective attitude of the physician, but the subjective attitudes of society which impinge on the physician as a member of society, and the judgment of the subjective attitudes of offenders, particularly of drug offenders, so that I find the statistical method of estimating chance occurrences of symptoms and deviations from chance occurrences are of particular value and importance in this type of work.

It seems that this opens a relatively new field in the adoption of methodology accepted in other branches of endeavor, such as sociology and psychology in the evaluation of psychiatric data and treatments. It opens a field of empirical clinical investigation which deserves careful scrutiny and attention.

DR. ROBERT S. CARROLL (Asheville, N. C.).—I presume I am the only one present who knew Dr. Lott, of Cameron, Texas, to whom Dr. Kolb referred today. I happened to be living within sixteen miles of him at the time he read his paper in June, 1901, outlining the use of hyoscine, or hyoscine hydrobromate, and within a few months the problem of morphine addiction was thrown upon my shoulders in an institution. Here the old extension and reduction method was employed. After I had seen one or two cases so treated, I was reminded of cutting off a cat's tail a quarter of an inch every day or two. That didn't seem quite the humane thing to do, so we utilized Dr. Lott's method, with this theory: It is not a specific; we are giving the patient an anesthetic during a period of deprivation symptoms, and the patient doesn't need large doses, not nearly the dose that Dr. Lott prescribed.

We soon learned if the patient could be kept in a state of twilight sleep, or forgetfulness, while the deprivation symptoms were going on, or during that period, all was well and good, and the deprivation symptoms—I might speak rather emphatically of my belief that there is a toxic condition which is relieved by castor oil, and for many, many years, in private institution work we have been very successful.

I am quite in agreement with the Doctor, that it isn't the removal of the drug that is the problem at all, that is very simple. Stop the drug, give scopolamin, give an ounce of castor oil every morning, and you will not have any vomiting, you will have no diarrhea, you will have no sweating. If they

begin to vomit, give more castor oil. Two ounces a day isn't any too much if the diarrhea gets bad. You have very little diarrhea with enough castor oil. You have something that may be called diarrhea, but it is quite different.

The real problem is the readjustment of the defective individual to society, and for that reason we receive no drug patients in our institution for less than a four-month period, of which ten days is used to eliminate the drug, and three months and a half to trying to teach that man how to live without the drug.

DR. LAWRENCE KOLB (Lexington, Ky.).—I wish to thank Dr. Bromberg and Dr. Carroll for their remarks, especially Dr. Bromberg for bringing out our statistical method, which I did not have time to talk about in reading the paper.

There was one other thing which is important, and that is the rossium treatment. This treatment has been advertised a great deal. It is based on the so-called anaphylactic theory of drug addiction, which is erroneous. We have tried the treatment in the Lexington Hospital, using controls, and we found rossium in the treatment of drug addicts to be absolutely useless.

CIRCUMSCRIBED CORTICAL ATROPHY IN THE PRESENILE PSYCHOSES—PICK'S DISEASE.

A Clinicopathologic Study.*

By CHARLES DAVISON, M. D., New York City.

Circumscribed cortical atrophy (Pick's disease), a form of presenile psychosis, is a rare disease and so far only two clinicopathologic studies have been reported in the English literature (Ferraro and Jervis,[1] and Lowenberg [2]). The disease occurs in individuals between the ages of 45 and 60 and is usually characterized clinically by progressive intellectual deterioration, focal symptoms such as aphasia, apraxia, agnosia, alexia and other neurologic signs depending upon the extent of the lesion. Pathologically, there is atrophy of the frontal and temporal and less often of the parietal convolutions. At times, all the convolutions of one hemisphere may be atrophied. The gyri are shrunken and narrow and the fissures are widely separated. The outstanding histopathologic picture consists of involvement of the gray matter of the atrophied convolutions. The nerve cells of the various lamellæ, especially those of the first, second and third layers, are decreased in number and show chromatolytic and chronic cell changes. This form of circumscribed cortical atrophy must be differentiated from Alzheimer's disease and senile dementia.

Report of Cases.

Case 1.†—E. N., a man, aged 63, painter by trade, admitted to the Elgin State Hospital, Elgin, Ill., June 24, 1932. The family history, except for a brother who died of hypertension at 70, was negative. The patient completed the eighth grade of school. His health had always been good until the age of 20, when he had pneumonia and typhoid fever. At times he complained of "painter's colic." He had no other serious illnesses or operations.

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† I am indebted to Dr. Charles F. Read and Dr. I. Finkelman for the report of this case.

He worked for the Pullman Company as a painter until 1929. He smoked excessively, but never used alcoholic beverages or drugs. He had been married twice. His first wife died and the second wife left him when his memory began to fail. There were no children or miscarriages from either marriage.

In 1929 the patient worried a great deal because he lost his job. At this time his memory became impaired and he was unable to recognize his sisters. Although he recognized faces, he could not remember names. He could not follow a conversation, seemingly because he was unable to keep his mind on any subject for any length of time. Shortly before admission to the institution, he complained of vague pains in the lower abdomen. During his stay there he slept much during the day but little at night.

Mental Examination.—The patient was restless, constantly moved about in his chair, and touched the wall, table, and his face with his hands. He seemed distractible, starting at every sound. At times he appeared despondent but this expression easily changed to a silly, childish smile and he seemed happy. He was confused. When shown a watch, he could not tell the time or give its name. He fondled the watch and seemed pleased with it like a child with a new toy. To most of the questions he answered, "I do not know how to talk." He denied having any sisters or brothers. He was very uncooperative and was disoriented for time and place. He repeatedly asked for his clothes and said, "You make me feel bad. I'm in a bad shape."

Physical and Neurological Examination.—An emaciated male, 5 feet, 7 inches tall, weighing 112 pounds, who continuously held his hands tightly to his scrotum. Heart and lungs were negative; blood pressure was 160/90; pulse rate, 60. The teeth were in poor condition but did not show any lead lines. The right pupil was irregular but reacted to light and in accommodation; there was a cataract of the left lens. Hearing was impaired bilaterally. The deep reflexes were slightly hyperactive. The abdominal reflexes were present but the cremasteric reflexes could not be elicited. There were no other pathological reflexes. A careful sensory status could not be done because of the lack of cooperation.

Laboratory Data.—The urine disclosed a specific gravity of 1.006, a slight trace of albumin, many leukocytes, and a moderate number of red blood cells. The Wassermann and Kahn tests of the blood and spinal fluid were negative. The cerebrospinal fluid was negative; the colloidal Lange reaction was 0011100000.

Course.—The patient had loss of sphincter control and became weak. He shouted, "I don't know how to talk," and his stream of speech consisted mostly of "Don't bother me." He behaved peculiarly. He moved the chair up against the wall after patting the chair and then the wall. He touched all objects within reach. He assumed many postures and was very distractible. He was unstable emotionally and showed an oscillation of mood. He mumbled to himself and his responses indicated confusion, disorientation and loss of memory. There developed ulcers and edema of both ankles. He died from lobar pneumonia March 24, 1934.

Autopsy.—Gross Examination: There was a lobar pneumonic process of both lungs. The heart was normal. The aorta contained calcified atheromatous plaques with some ulcerations. The bladder was small and contracted; the mucosa was somewhat injected and finely trabeculated. The prostate was small but normal. The prostatic urethra and verumontanum showed atrophy. All the other organs were normal.

Brain: The brain weighed 1075 grams. There was slight atrophy of the left frontal, first, second and third right temporal convolutions and marked atrophy of the first, second and third left temporal convolutions and of the fusiform and hippocampal gyri (Fig. 1). The convolutional atrophy was best seen upon the removal of the meninges. The brain was cut coronally. The right hippocampus appeared more atrophic than the right temporal convolutions. The caudate nuclei were slightly shrunken. The left insular convolutions were also atrophied. The convolutions in the region of the left posterior horn appeared normal. The brain-stem and cerebellum showed no abnormalities.

Microscopic Examination.—Brain: Coronal sections of the left and right hemispheres were cut separately and stained with the myelin sheath and cresyl violet methods. Additional stains with the following methods: Holzer, Bielschowsky, Sudan III, Braunmühl, and Hortega stain for microglia and oligodendroglia, were made on other sections from various parts of the entire central nervous system.

Sections of the left hemisphere, through the basal ganglia, disclosed a wide separation of the fissures, atrophy of the frontal convolutions, and marked atrophy of the temporal convolutions (Fig. 2A). The white matter of the second left frontal convolution contained a few lacunæ; the white matter of the left temporal convolutions, especially on the inner surface, was partially demyelinated. The cortical gray of the temporal convolutions at this level was separated from the white matter. The right temporal convolutions also appeared slightly atrophic (Fig. 2B) and their white matter stained poorly.

In sections through the thalamic nuclei, there was marked atrophy of the first two left temporal convolutions and of part of the fusiform and hippocampal gyri (Fig. 3A). The gray matter of the third left temporal convolution was slightly separated from the white. The right temporal convolutions were also slightly atrophied (Fig. 3B). In sections further caudally, the outstanding atrophy was in the third left temporal convolution and in the hippocampus. In sections through the posterior horns, there was slight atrophy of the superior parietal and inferior parietal convolutions. In the complete coronal sections stained with cresyl violet, the cortical gray of the affected convolutions took a slightly deeper stain.

Small sections were taken from the various cortical convolutions.

First, second and third left frontal convolutions: The arrangement of the cyto-architectural layers was slightly distorted; this was best observed in the third frontal convolution. Most of the ganglion cells stained poorly; they contained little cytoplasm and, in many, the nuclei were displaced to the periphery. Some of the ganglion cells were slightly disintegrated. Dropping-

out of ganglion cells was most marked in the second and third frontal convolutions, while more marked chromatolytic changes were seen in the third left frontal convolution (Fig. 5). The changes in the ganglion cells were equally distributed throughout all the cortical layers, especially in the upper layers. There was a slight increase in the glial elements. The cortical vessels showed moderate atherosclerotic changes. No abnormalities were noted in the white matter. In the Sudan III preparation, deposits of fat were noted in the ganglion and glia cells. Proliferation and hypertrophy of astrocytes and microglia cells were best observed in the silver preparation. The right frontal convolutions showed insignificant pathological changes.

Left temporal convolution: The entire cortex at this level was thinned out. There was distortion in the arrangement of the cyto-architectural layers, and increase in the glia cells, most noticeable in the last three layers (Fig. 4). The ganglion cells, especially those in the last three layers, were slightly swollen, chromatolytic (retrograde changes) and contained peripherally displaced nuclei. Complete destruction of some of the ganglion cells in the third and fifth layers was also noted. Some of the blood vessels and capillaries showed atherosclerotic and hyalin changes with areas of degeneration around them. Collections of amyloid bodies surrounded some of the perivascular spaces (Fig. 6). Occasional hypertrophied microglia cells were noted. In some areas a slight amount of free blood pigment or pigment engulfed in compound granular corpuscles was seen. In the Holzer preparation, there was astrocytic proliferation in both the gray and white matter and marked gliosis of the white matter (Fig. 7). In the Sudan III preparation, small amounts of fatty deposits were found in the perivascular spaces. The ganglion cells of the third and fifth layers were loaded with fat. Senile plaques or Alzheimer ganglion cells could not be demonstrated in the Braunmühl or Bielschowsky preparations.

Slight pathologic changes were also noted in the right temporal convolutions; these, however, were not as extensive as in the left temporal convolutions.

The left hippocampus was shrunken (Fig. 3A). Except for an occasional dropping-out of a ganglion cell in Sommer's sector, the nerve cells in this gyrus stained much better than those in the temporal region. In the Sudan III preparation, the white matter contained fatty deposits in the glia and ganglion cells and in the perivascular spaces.

Occipital convolutions: Except for congestion of the vessels and an occasional poorly stained cell, no abnormalities were noted.

Diencephalon and mesencephalon: Sections through these structures showed no abnormalities.

Cerebellum: Many of the Purkinje cells were swollen and showed loss in Nissl substance and peripherally displaced nuclei (Fig. 8).

Medulla oblongata: A number of ganglion cells of the right nucleus paraolivaris dorsalis were swollen. Some of them were balloon-shaped, contained little or no Nissl substance, and their nuclei were displaced to the periphery. The other nerve cells of the olivary nuclei and gray masses appeared normal.

Comment.—The outstanding picture in this case was the marked atrophy of the temporal convolutions, hippocampus and part of the frontal convolutions on the left side. The finer histopathologic picture consisted of distortion in the arrangement of the cytoarchitectural layers of the left temporal lobe, and retrograde changes in the ganglion cells. Of interest in this case was the marked swelling of the nerve cells near the nucleus paraolivaris dorsalis.

The atherosclerotic changes of the smaller cortical vessels were considered as the possible cause of the atrophy. The diencephalic region, which showed similar atherosclerotic changes of the vessels, did not contain any alterations in the ganglion cells. The absence of senile plaques and of Alzheimer fibrillary nerve cells favor a diagnosis of Pick's disease. The appearance of the psychic manifestations rather late in life has been described in a few instances.

CASE 2.—H. Z., a man, aged 42, a peddler, admitted to the Montefiore Hospital, February 1, 1931. There was no familial history of nervous or mental disorders. The patient had been well until July, 1930, when there developed attacks of stiffness of the entire body, preceded by a cry and a few jerks of the forearms. These attacks, which occurred at any time and on an average of two to four times per day, were not preceded by an aura. Six months later he began to fall during these fits. The seizures, which now lasted longer (from two to three minutes), were still unaccompanied by unconsciousness, frothing at the mouth, biting of the tongue or loss of sphincteric control. The convulsions were followed by a period of confusion. Since the onset of the illness the patient had had loss of libido, marked impairment of memory, especially for recent events, and had become silly, irritable, argumentative and euphoric.

Physical and Neurological Examination.—Except for the neurologic findings, the examination was negative. There was generalized diminution in muscle power. The deep reflexes were slightly hyperactive on the right. The sensory examination was negative. The fundi were normal. The pupils were slightly irregular but reacted well to light and in accommodation. There was a slight right facial weakness on mimetic innervation. The tongue deviated slightly to the right.

During a convulsive seizure the patient suddenly began to stiffen and fall backward; the face became deeply congested, and the hands were pulled up in front of the face like a boxer on the defensive. The extremities were in tonic spasm and the eyes remained open and staring. Examination during an attack revealed absence of pathologic reflexes and widely dilated pupils, which did not react to light. The attack lasted about one-half minute, at the end of which time the patient seemed dazed and started walking about aimlessly, smiled fatuously and refused to answer questions or carry out simple commands. The attack, as stated, was not accompanied by biting of the tongue,

clonic spasms or incontinence of sphincters. After five minutes he was more cooperative, but his behavior was sillier than before.

Mental Examination After a Convulsive Attack.—The patient showed lack of attention and cooperated poorly. The memory was poor for recent and remote events, that for recent events being more seriously impaired. He was confused, disclosed a partial aphasia, had difficulty in naming objects (anomia), and perseverated. He could describe the use of common objects such as a pen, pencil, watch and keys, but could not give their names. The greatest difficulty in speech was with the most recently acquired language, English. He stated that today (Monday) was Saturday and could not remember what or when he ate last. He was poorly oriented for time and place. He could not do simple arithmetical sums. He could tell time. Occasionally he talked quite sensibly, while at other times the answers in regard to sequence of events and their significance were poor and he appeared confused. There were no hallucinations, delusions or confabulations.

Three hours after a convulsive seizure, a detailed aphasia status revealed no marked deviation from the normal. There was no difficulty in formulation of speech or comprehension. Simple and complicated commands were carried out well, and the following objects were identified with great facility: glass, pitcher, keys, watch, pencil, tie, shirt, shoes, trousers, finger, nose, fingernail, eyes, matches, cigarette, various coins and envelope. When shown a fountain pen, he described its use correctly, but called it an envelope. He recognized the primary colors. Counting was accurate to 100 and backward from 10 to 1. He told the time correctly and was able to adjust the watch to any specified time. He read German, Jewish and English correctly. Although previous to the illness he could write, he was unable to do so now. The memory impairment during the normal state, however, remained the same as that following a seizure. He was not concerned about his illness, smiled inordinately and showed a tendency to euphoria. Cooperation and attention and ideation were poor. The judgment was impaired.

Laboratory Data.—Encephalographic study disclosed dilatation of the left anterior horn of the lateral ventricle and collections of air in the subarachnoid spaces over the premotor, motor, parietal and occipital convolutions (Fig. 9A and B). The blood pressure was 120/70. The Wassermann of the blood and spinal fluid was negative.

Course.—About three months after admission, the facetiousness, the lack of insight and the impairment in memory and judgment became more marked. He became poorly oriented as to time and place. He wandered off aimlessly in various parts of the hospital. The anomia became pronounced and he had difficulty in naming simple objects at all times. The mental picture at this time was the same as that immediately or days after a fit. The exaggerated deep reflexes on the right and the right mimetic facial became more marked. A diagnosis of frontal lobe neoplasm or Alzheimer's disease was considered. An exploratory craniotomy was performed January 8, 1932, in the left fronto-parietal region. The brain had a slight yellowish discoloration; the veins were more prominent than normal. The relative extreme degree of dilated left ventricle with the absence of increased intracranial pressure pointed

to an atrophic cortex as the probable cause of the epilepsy. Following the operation, the patient pulled off his dressing and on January 15, 1932, developed signs of meningitis and bronchopneumonia, and died January 19, 1932.

Autopsy.—Gross Examination.—Brain: The brain weighed 1300 grams. The dura in the region of the operative flap was thickened, hemorrhagic and contained mucopurulent material. The meninges likewise contained mucopurulent material, and were adherent to the brain. There was a slight subarachnoid hemorrhage over the right premotor and motor convolutions. The right hemisphere was larger than the left. The brain was cut coronally. The convolutions of the left hemisphere were smaller than those of the right; the left temporal and hippocampal gyri showed the greatest amount of atrophy. The *spinal cord* was normal.

Microscopic Examination.—Brain: Complete coronal sections and small sections from various regions of the nervous system were studied by the same methods as those in Case 1.

In coronal sections through the frontal region, the left hemisphere was smaller than the right (Fig. 10A). There were no areas of demyelinization. The third and fourth cortical layers in the first left frontal convolution disclosed a slight pale area. The meninges were thickened and infiltrated with polymorphonuclear leukocytes, plasma and endothelial cells. Occasionally a small cortical vessel in the marginal zone contained a few lymphocytes. In the cresyl violet preparation, the arrangement of the cyto-architectural layers of the first left frontal convolution was distorted. Occasional areas of devastation were seen. The nerve cells throughout all cortical laminæ showed various pathologic changes, such as dropping-out, chromatolysis and peripherally displaced nuclei (Fig. 12). In the second and third left frontal convolutions, in addition to the above pathologic changes, there were also ischemic cell changes; numerous astrocytes and microglia cells were also seen. Slight disintegration of single myelin sheaths near the sixth cortical layer was observed in the myelin sheath preparation. The right hemisphere, except for the meningitis (post-operative), appeared normal. In the Braunmühl and Bielschowsky preparations, senile plaques or Alzheimer fibrillary changes in the nerve cells were not seen.

In sections through the third ventricle, the convolutions of the left hemisphere were smaller than those on the right; this process was most marked in the temporal convolutions (Fig. 10B). In the cresyl violet preparation, all the cortical laminæ of the temporal and hippocampal convolutions were distorted and showed changes similar to those found in the left frontal convolutions. Most of the pathologic changes were in the vicinity of Sommer's sector. A small area of softening consisting of compound granular corpuscles, destroyed ganglion cells and proliferated vessels was found at the border of the lateral and medial nucleus of the left thalamus (Fig. 10B). The parietal cortex also showed slight ganglion cell changes like those found in the temporal lobe.

Coronal sections through the red nucleus disclosed atrophy of the convolutions of the left hemisphere; the temporal lobes and hippocampus showed

the greatest atrophy. The third ventricle was slightly dilated and distorted. The changes in Sommer's sector and temporal lobes were identical with those described in the previous sections. The process in the left parietal area was less marked than in the frontal and temporal convolutions.

In sections through the occipital horns, the convolutions on the left side were atrophied (Fig. 11) and the ganglion cells of the second and third layers of the left fusiform, lingual and inferior temporal convolutions disclosed changes similar to those described in the hippocampus.

In the Sudan III preparation, deposits of fat were found in the nerve cells of the left frontal, motor, parietal, hippocampal, temporal and fusiform gyri; these were more noticeable in the first, second and third layers. Breaking-down of myelin was found in the white matter bordering the sixth layer. In the Braunmühl stain, sclerotic plaques could not be identified. Alzheimer fibrillary nerve cell changes could not be demonstrated by the Bielschowsky method, but the nerve cells of the first left frontal, temporal and hippocampal regions showed argentophilic bodies.

Comment.—Two distinct pathologic processes were found in the nervous system of this case. (1) Convolutional atrophy of the left hemisphere affecting mostly the left first frontal, first and second temporal convolutions and Ammon's horn (Sommer's sector). This process was characterized by chromatolysis of nerve cells and increase in glia cells. Against Alzheimer's disease was the absence of fibrillary changes in the nerve cells and senile plaques. (2) The meningitis was secondary to the operation. The changes in the brain substance due to this meningitis were easily differentiated from the main pathologic process.

CLINICAL CONSIDERATIONS.

Circumscribed cortical atrophy in the presenile psychoses (Pick's disease) has been described clinically in about 70 cases. It occurs twice as frequently in females as in males. The ages vary from about 40 to 65 years. The youngest patient afflicted with the disorder was 38 years old (Richter [3]), while the oldest cases were 79 and 91 years old (Braunmühl [4] and Moyano [5]). Our first patient was 63 and the second 42 years old. The average duration of the illness is from three to six years; in some instances it lasted as long as 12 years. A familial incidence was reported by Grünthal [6] in two brothers, and by Braunmühl and Leonhard [7] in two sisters. Grünthal reported five instances of this disorder in two generations, and Schmitz and Meyer [8] followed the affection in two generations. Familial antecedents were recorded by Scholz,[9] Braun-

mühl,[4] and Pick.[10] The occurrence of psychosis, feeble-mindedness, epilepsy and other degenerative diseases such as Marie's heredo-cerebellar ataxia, Huntington's chorea, amyotrophic lateral sclerosis in other members of families afflicted with Pick's disease was mentioned by several observers (Gans,[11] Anglade,[12] Korbsch,[13] Verhaart,[14] Hascovec,[15] and others). Alcoholism, syphilis, trauma, toxins and infections were considered by some as precipitating factors in the onset of the disease.

The symptomatology does not follow a set rule. The condition has an insidious onset. At first the patient may complain of headache, insomnia and nervousness. The early phase of the disease usually consists of a slight increase in motor activity and asocial conduct. The patient may suddenly show impairment in moral or other judgments, child-like reactions, slight confusion, aimless wandering, facetiousness or euphoria. Some patients, instead of increase in motor activity, may present a loss of initiative of certain duties, dullness, drowsiness and sleepiness. Although the memory is not impaired at first, gradually there is usually loss for recent and less for remote events, poor concentration and clouding of consciousness. The most elementary things, such as what he ate last, are not remembered by the patient. Orientation also becomes markedly impaired. Questions are answered briefly in an obscene or silly manner and repetition of meaningless words or phrases (echolalia) is not uncommon. Delusions, hallucinations and confabulations, frequently observed in Alzheimer's disease, are not common in Pick's disease.

With the gradual loss of memory, the symptoms of a partial aphasia become apparent. Anomia, as in the second case, acalculia and agrammatism occur more frequently than total aphasia. Speech may be limited to a few stereotyped phrases. Perseveration, paraphasia, logoclonia and apraxia are not uncommon findings. Finally the patient becomes completely demented and bed-ridden.

Epileptiform convulsions are not infrequent; these may appear as Jacksonian seizures. The second patient had aphasia and marked anomia lasting for several hours after the seizure. Later in the illness the anomia became permanent. Choreiform movements, sucking and grasping reflexes, and carphologia were also described in a few instances. There are no disturbances in gait; later in the

course of the disease, the gait may become slow and uncertain. The reflexes are normal; occasionally they may be exaggerated and a Babinski toe sign may be elicited. A mimetic facial was observed in the second case. The intellectual impairment interferes with the evaluation of the sensory status. Vegetative disturbances, as noticed in Alzheimer's disease, are less frequently noted in Pick's disease. Encephalographic studies, as in the second instance, show extensive filling of the subarachnoid spaces over the frontal lobes and dilatation of the ventricles. As the lesions occur more frequently in the left hemisphere, the left lateral ventricle becomes enlarged.

The clinical differentiation from Alzheimer's disease is very difficult. Pick's disease begins at about the same age as Alzheimer's. Memory defects in all spheres, such as reception, retention and reproduction, supposedly occur much earlier and are more widespread in Alzheimer's disease. In the late stages, memory is practically gone in Alzheimer's disease, whereas some retention of it can be demonstrated in Pick's disease. Delusions, hallucinations, confabulations, spontaneous speech, palilalia, reiteration and logoclonia occur more commonly in Alzheimer's disease. Epileptic seizures may appear more frequently in Alzheimer's than in Pick's disease. Encephalographic studies in Pick's disease show collections of air limited to the frontal and temporal regions whereas in Alzheimer's disease, the collections are found over the entire subarachnoid space. These air collections may be absent.

Pathological Considerations.

The weight of the brain is reduced and there is usually marked atrophy of the fronto-temporal convolutions; the fissures and sulci are widely separated. Atrophy of the insular, hippocampal, parietal and occipital convolutions has been reported. In the first, as in Ley's[16] (*et al.*) case, the hippocampus was extensively atrophied while the motor and parietal convolutions were involved to a lesser degree. The insular convolutions are frequently involved, the anterior more than the posterior parts. Atrophy of the parietal lobe, as in Case 2, was also reported by Pick,[10] Altmann,[17] Verhaart,[14] and Braunmühl.[4] In parietal lobe lesions, the angular and supramarginal gyri are most extensively involved. Solitary involvement of the occipital lobe, although rarely found, was recorded by Pick,[10] Pötzl,[18] Rosenfeld,[19] and Horn and Stengel.[20] The occipital lobe

in the second case was partially atrophied. Combinations of fronto-occipital, temporo-occipital, or parieto-occipital atrophies have been previously reported. The pole of the occipital lobe usually shows the greatest destruction, while the calcarine region shows the least. The superior temporal is less extensively implicated than the other two temporal convolutions. The left hemisphere is more frequently involved than the right, thus accounting for the partial or total aphasia commonly present in this disorder. As a result of cortical atrophy, a slight internal hydrocephalus is not an uncommon finding. Atrophy of the basal ganglia (Braunmühl,[4] Van Bogaert,[21] and Ley [16] *et al.*) and atrophy of the pons and cerebellum (Verhaart,[14] Case 1) are rarely observed.

Microscopically, the changes occur mainly in the cortical gray matter, although the white matter as shown by others and in the present cases may also be slightly affected. Usually there is distortion in the arrangement of the cyto-architectural layers, especially of the atrophic convolutions. Some authors believe that most of the pathologic changes occur in the first three cortical layers, while others noted alterations in the last three cortical laminæ. Bonfiglio [22] and others, who believe that all the cortical laminæ are affected, are undoubtedly right. Partial derangement with laminar distribution may at times be seen in the less atrophic areas. In the first case, the pathologic changes were equally distributed throughout all cortical laminæ of the frontal convolutions, whereas in the temporal convolutions the changes were most marked in the last three laminæ. In the second case, all the cortical laminæ of the atrophic convolutions were equally affected; the pathologic changes in the left fusiform, lingual and inferior temporal convolutions were in the second and third cortical laminæ. The selective destruction of certain cortical laminæ (Braunmühl,[4] Altmann,[17] Schneider,[23] Jacob,[24] Onari and Spatz,[25] and others) led Martha Vogt [26] to attribute the process to an eumonic form of pathoclisis characterized by a series of regular and constant successions in various sectors.

The ganglion cells of the atrophic convolutions show retrograde changes such as swelling, loss in Nissl substance, peripherally displaced nuclei (Figs. 5 and 12), and pigmentary changes. Chronic and ischemic cell changes may also be present. In the silver preparations, the nerve cells show collections of argentophile bodies vary-

ing in size. The retrograde changes and the deposition of argentophile granules are characteristic of the disease. Acellular areas surrounding the vessels, as in the present two cases, and patchy areas of demyelination have also been reported by others. The demyelination is seldom complete. The white matter near the atrophic convolutions may show myelin sheath and axis cylinder destruction. Mingazini [27] first called attention to the rarefaction of the tangential and radial fibers. These fibers were found intact by most authors. Braunmühl,[4] Schneider,[23] and others believe that primary destruction of fibers is mostly found in cases of rapid progression. Myelin sheath destruction was found in the first case, although the illness lasted over five years. The glia proliferates extensively, as evidenced by the abundance of glia fibers, astrocytes and microglia cells. Fatty degeneration of nerve cells and large amounts of iron deposits are also found. Although the blood vessels in most cases were found normal, hyalin changes, as in the first case, were also reported by Austregesilo,[28] Ferraro [1] *et al.*, and others.

Pathologic changes have occasionally been described in the striatum (Braunmühl,[4] Van Bogaert,[21] Ley [16] *et al.*) and cerebellum (Verhaart [24]). In the second case, a small area of softening was found in the left thalamus. Liébers [29] found a partial atrophy of the thalamus which he believed to be secondary to the lesion in the frontal lobe. Cerebellar lesions were found in Scholz's [9] and Verhaart's [24] cases, while some changes in the Purkinje cells were found in my first case. Senile plaques or Alzheimer fibrillary changes of the ganglion cells, frequently found in Alzheimer's disease and senile dementia, are usually absent in Pick's disease. Senile plaques have been described in Pick's disease by some observers (Kufs,[20] Braunmühl,[4] Altmann,[17] Springlova,[31] Verhaart,[14] Marcus,[32] Guiraud and Cannu,[33] Moyano,[5] Frets,[34] Austregesilo,[28] and Ladame [35]).

PATHOGENESIS.

Several theories are offered to explain the cortical atrophy. The disease has been considered by some observers heredo-degenerative in nature, because of the familial incidence (Grünthal [6] and others), the occurrence in siblings, and the association with other degenera-

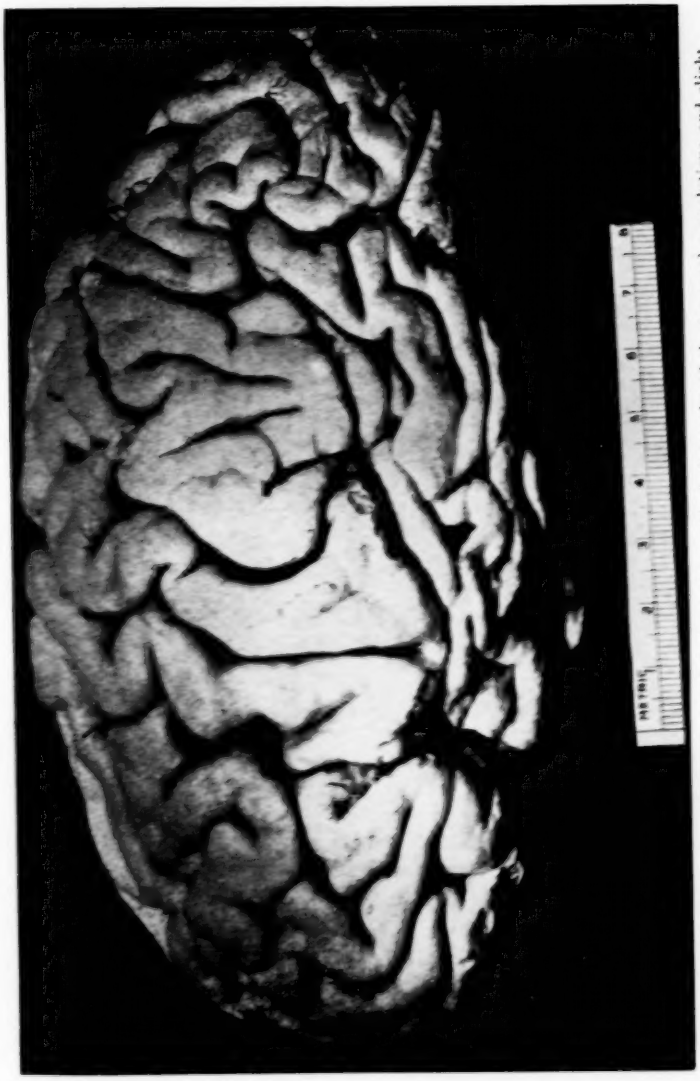


FIG. 1.—(Case 7.) Lateral view of the left hemisphere. Marked atrophy of the temporal convolutions and slight atrophy of the frontal convolutions.

FIG. 2A.—(Case 1.) Coronal section of the left hemisphere passing through the middle of the basal ganglia, showing marked atrophy of the temporal and some atrophy of the frontal convolutions. Notice the demyelinization of the white matter of the temporal convolutions, especially on the inner surface, and the separation of the gray matter.

FIG. 2B.—(Case 1.) Coronal section of the right hemisphere at about the same level as Fig. 2A, showing slight atrophy of the temporal convolutions and its poorly stained white fibers. Myelin sheath stain.

sphere passing through the middle of the basal ganglia, showing marked atrophy of the temporal and some atrophy of the frontal convolutions. Notice the demyelinization of the white matter of the temporal convolutions, especially on the inner surface, and the separation of the gray matter. Myelin sheath stain.

sphere at about the same level as Fig. 2A, showing slight atrophy of the temporal convolutions and its poorly stained white fibers. Myelin sheath stain.



FIG. 3A.—(Case 1.) Coronal section of the left hemisphere passing through the corpus Luysii and cerebral peduncle, showing marked atrophy of the temporal convolutions, fusiform and hippocampal gyri. Myelin sheath stain.



FIG. 3B.—(Case 1.) Coronal section of the right hemisphere passing through the beginning of the red nucleus, showing slight atrophy of the temporal convolutions and marked atrophy of the hippocampus. Myelin sheath stain.

FIG. 5.—(Case 1.) Chromatolysis and retrograde changes in the ganglion cells of the third left frontal convolution. Cresyl violet stain. × 200.

FIG. 4.—(Case 1.) Distortion in the arrangement of the cyto-architectural layers and increase in the glia cells in the last three layers. Left temporal convolution. Cresyl violet stain. × 50.

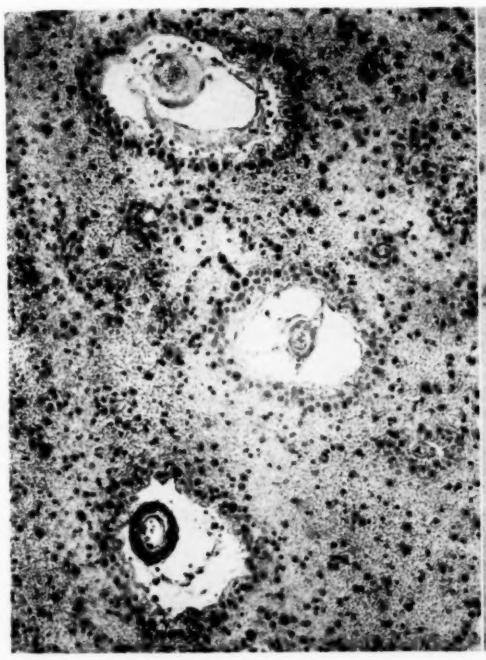


FIG. 6.—(Case 1.) Amyloid bodies and hyalinized vessels from the left temporal lobe. Van Gieson stain. × 70.

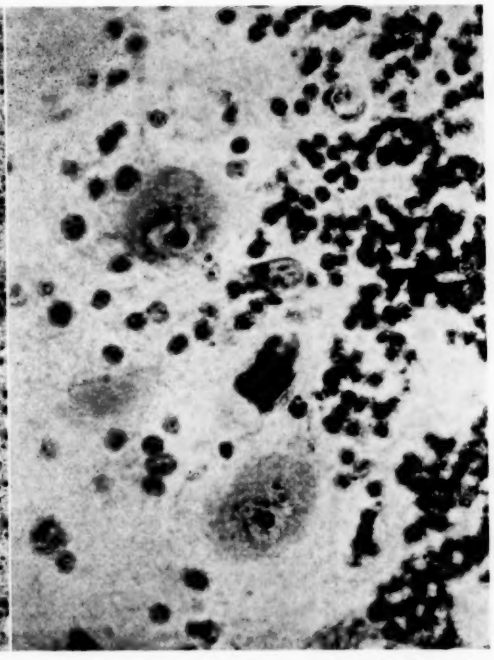


FIG. 8.—(Case 1.) Swelling, chromatolysis, and peripherally displaced nuclei of the Purkinje cells. Cresyl violet stain. × 400.



FIG. 7.—(Case 1.) Gliosis in the left temporal lobe. Holzer stain.



FIG. 9A.—(Case 2.) Antero-posterior encephalogram showing dilatation of the left lateral ventricle.

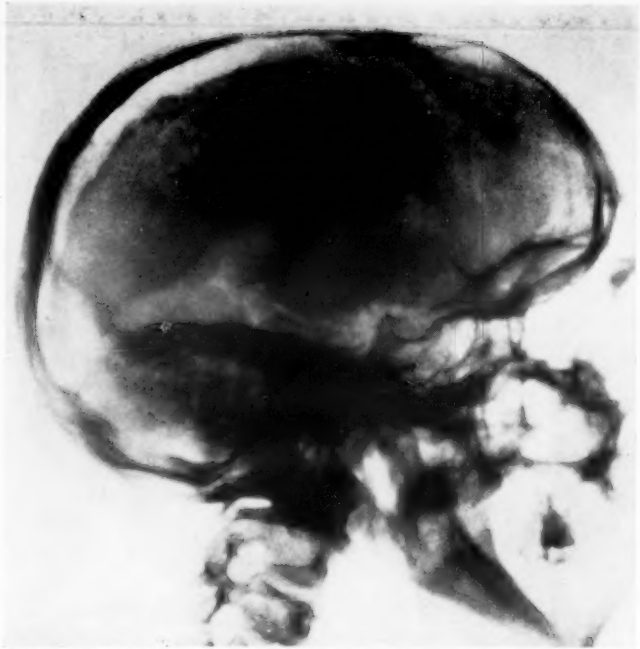


FIG. 9B.—(Case 2.) Lateral encephalogram showing collections of air in the subarachnoid spaces of the premotor, motor, parietal and occipital convolutions.

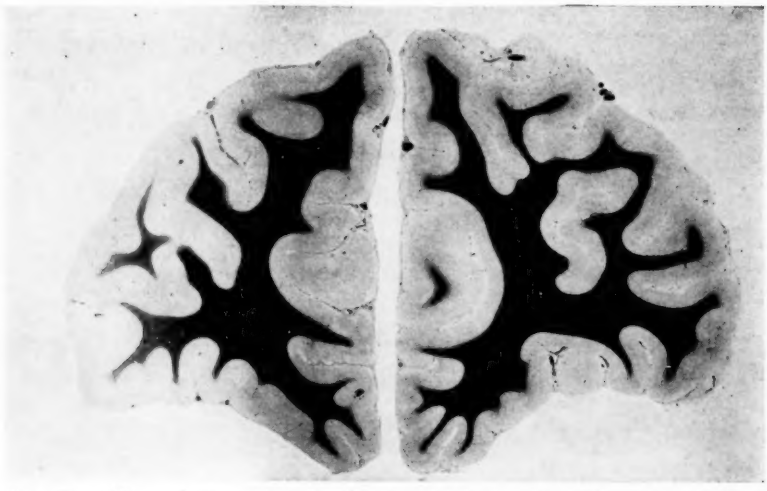


FIG. 10A.—(Case 2.) Coronal section disclosing atrophy of the left frontal convolutions. Myelin sheath stain.

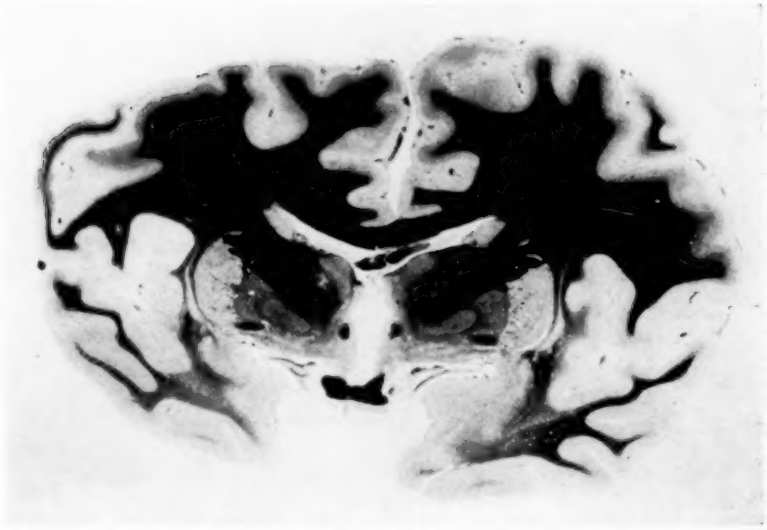


FIG. 10B.—(Case 2.) Coronal section through the third ventricle showing atrophy of the left motor and temporal convolutions. Notice the small area of softening of the left external nucleus of the thalamus. Myelin sheath stain.

FIG. 9A.—(Case 2.) Antero-posterior encephalogram showing dilatation of the left lateral ventricle.

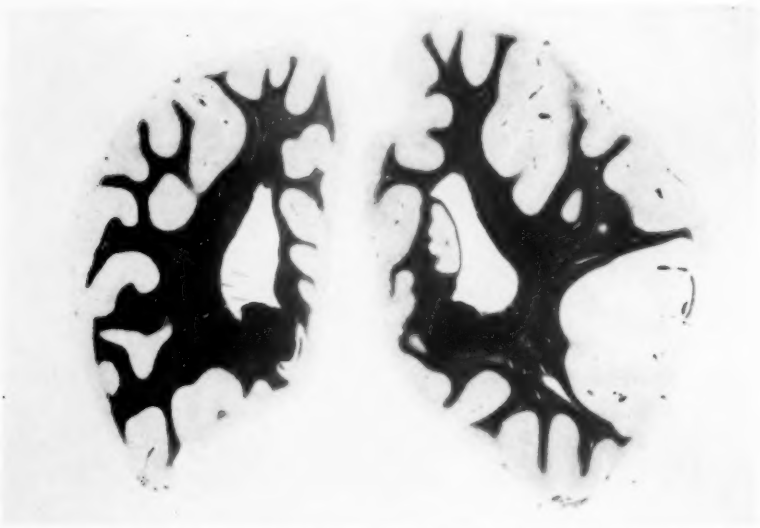


FIG. 11.—(Case 2.) Coronal section through the posterior horn of the lateral ventricle. Atrophy of the left superior and inferior parietal, third temporal, fusiform, lingual and precuneus convolutions. Myelin sheath stain.

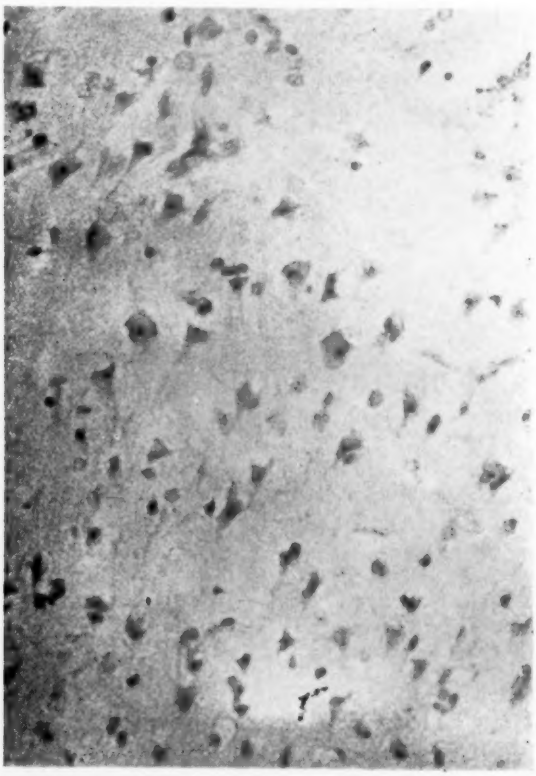


FIG. 12.—(Case 2.) Chromatolysis and dropping-out of nerve cells in the left frontal convolutions. Cresyl violet stain. × 200.

tive neural disorders. Whether these hereditary traits are mere chance associations or form part of the clinical picture cannot be definitely stated at present, as the cases recorded are too few in number.

Gans [11] and others, owing to the presence of the atrophic process in the Flechsig association zones and in certain cytoarchitectural areas of Brodman, believed that the pathologic process is limited to phylogenetically younger parts of the brain. Onari and Spatz,[25] and others believe the process is not limited to the phylogenetically younger cortical convolutions, but also to parts of the archipallium. The involvement of the hippocampus in this report and in those recorded by Ferraro [1] and others seems to support Onari's and Spatz's [25] contention. The selective implication of specific cortical laminæ found in some of the recorded cases induced some investigators (M. Vogt,[26] and C. and O. Vogt [36]) to explain the process on the basis of specific vulnerability (pathoclisis) of the nerve cells of these areas. A review of most of the clinicopathologic cases of Pick's disease discloses the absence of involvement of specific cortical laminæ.

Pick,[10] in his original contributions, believed that he was confronted with a form of senile dementia with the possible selection of the association centers. Critchley [37] is of the opinion that there is a precocious aging of the neurons and that Pick's disease and the delayed cerebellar atrophies are examples of a selective involutional process. The physicochemical process responsible for the argentophile substances in the nerve cells as a result of disturbance in the colloidal equilibrium, according to Braunmühl,[4] is common to senility and therefore found in it, in Pick's circumscribed cortical atrophy and in Alzheimer's disease. The circumscribed areas of cellular atrophy, the perivascular accumulations of glia cells and the patchy areas of demyelination, according to Ferraro [1] *et al.*, are sufficient evidence that the lesions in this disorder are angiospastic in character. The hyalin changes in the vessels of the first case, most marked in the temporal lobe, and the observation of similar findings in a number of other cases, suggest that in some cases at least, disease or spasm of the cortical vessels producing cerebral anemia plays a rôle in the pathogenesis of this condition. Spielmeyer has emphasized that the localized degeneration in certain cortical areas, especially in the cornu ammonis, may be due to

peculiarities of vascular supply. Furthermore, the disturbance in colloidal equilibrium may liberate toxic substances of unknown origin acting on the vessels and the surrounding tissue.

SUMMARY.

Two cases of circumscribed cortical atrophy (Pick's disease) are described. The clinical differentiation of this affection from Alzheimer's disease and senile dementia is difficult. Histopathologically, there was atrophy of the left hemisphere in both instances; the temporal and the hippocampal convolutions showed the most extensive involvement. In the second case the atrophy also extended to the parietal convolutions. Practically all the cyto-architectural layers of the affected convolutions were distorted and the ganglion cells showed retrograde and other pathologic changes. In the second case the second and third cortical laminæ were more involved than the other layers. Of unusual interest in the first case were the atherosclerotic changes in the vessels of the left temporal lobe, the swelling and chromatolytic changes of the Purkinje cells of the cerebellum and of some of the nerve cells of the medulla oblongata.

The various pathogenetic theories accounting for the production of this disorder are discussed.

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DISCUSSION.

CHAIRMAN BREUTSCH.—I should like to ask Dr. Davison in what percentage is it possible to make a clinical diagnosis of Pick's disease. The symptoms of Alzheimer's disease are also found in various conditions of the senile period, which show an entirely different etiology. Out of 500 cases in the hospital, where I made a postmortem, we did not have a single case of Pick's disease.

DR. DAVID ROTHSCHILD (Foxborough, Mass.).—There is little that I can add to Dr. Davison's excellent description of Pick's disease. I have had no personal experience. It is a very rare disorder. I think Alzheimer's disease is more common.

In attempting a clinical differentiation from Alzheimer's disease, I would emphasize the pronounced affective features, such as perplexed, apprehensive,

agitated states, and acts of hallucinatory periods in Alzheimer's disease, whereas, in Pick's disease, one is more apt to observe an affective emptiness or at least a certain lack of mental productivity in general. Yet, I feel that it is extremely difficult to make a diagnosis on clinical grounds, and I think that this difficulty is probably due to the variable distribution of the chief changes.

If the involvement were constantly limited to one lobe, such as the frontal lobe, we might be able to work out a more or less constant symptomatology, but the involvement varies considerably from case to case.

In attempting to explain the origin of Pick's disease, Dr. Davison has suggested that vascular factors may play a rôle. While observations in a few cases may point in that direction, it seems to me that the weight of the evidence still suggests a degenerative condition independent of vascular factors of primary importance.

It may be that we are dealing with an unusual combination of vascular factors and primary parenchymatous involvement which may perhaps argue for the position of Pick's disease as a sort of border type between a number of other conditions.

In many respects the disease resembles Alzheimer's disease and senile dementia to which it has often been compared. I have seen two cases of Alzheimer's disease with gross circumscribed atrophy as a result of which the brain strongly resembled the brain described in Pick's disease, and, of course, there are cases of Pick's disease which show senile plaques and neurofibrillary changes of the type seen in senile cases and in Alzheimer's disease.

I don't think we can dismiss such observations. I think that they probably represent transition forms between Pick's and Alzheimer's disease.

The histologic changes in Pick's disease themselves are not specific, changes such as these swollen cells which at once were regarded as pathognomonic are not always present.

There is a certain amount of diffuse atrophy in Pick's disease, although this has not as a rule been emphasized. It is interesting to note that Pick's disease is twice as frequent in female as in male patients, and I found a similar predominance in a group of senile patients. On the other hand, in a group of patients with cerebral atherosclerosis, the male patients outnumbered the females by more than two to one.

It seems to me there is a good deal of evidence in favor of Von Braunmühl's conception that in Pick's disease, Alzheimer's disease and senile dementia, and even perhaps in other degenerative conditions, we are really dealing with varying manifestations of the same general type of tissue reaction which affects now one structure and now another.

Dr. Lloyd J. Thompson (New Haven, Conn.).—I think the paper that Dr. Kahn and I presented at the Boston meeting some years ago probably started this series that you referred to. I remember our paper at that time agreed very much with what Dr. Davison said today. However, we did point out that convulsive seizures, focal neurological signs, outside of aphasia

and associated things, and arteriosclerosis was decidedly rare in Pick's disease, and, therefore, this second case that was given today certainly is an unusual case because it combines all of those things.

I followed the literature since to some extent, and there is a great deal in German literature indicating more and more the possibilities of heredity in this disease. They have uncovered many cases in which there is a definite hereditary element.

DR. MAX H. WEINBERG (Pittsburgh, Pa.).—I should like to ask: Were these cases uncinate in type in the second group you described? Was there also a change in the rod cells?

Another question in general is how can we in a condition like this, which seems to be so far widespread throughout the entire brain, determine the definite symptoms? The symptoms should depend on what areas are involved.

DR. CHARLES DAVISON (New York, N. Y.).—All I can say in reference to the Chairman's question is that he is quite correct: clinically it is difficult to diagnose Pick's disease. As a matter of fact, a number of observers at our institution have considered the possibility of cerebral neoplasm in the hippocampal or temporal regions. In answer to Dr. Weinberg, I might say that my patients had no uncinate fits. We considered the diagnosis of Alzheimer's disease and cerebral neoplasm because of the youth of the patient, aged 42, and the encephalographic findings. There were no localizing signs, but because of the right mimetic facial, the operation was done on the left.

Clinically, diagnosis is difficult. As to the various theories enumerated by Dr. Rothschild and included in my paper, it is arbitrary as to what really comprises the pathogenesis of these various disorders. Whether we are dealing with some colloidal disturbance of the chemistry of the brain at this particular age, or with vascular changes, as was demonstrated in a few instances, are questions which will not be solved until we have studied a greater number of cases.

The changes, as you will remember, in these cases were not those found in paresis. In paresis there is a disarrangement of the cortical layers, but there are also perivascular infiltrations, usually of the lymphocytic variety. Such changes were not found in our cases. As to the rod cells which are frequently described in paresis, I might say that they can be found in any type of reaction of the nervous system. In addition the serology of the blood and spinal fluid in both instances was negative. The histopathology was certainly not that seen in cerebrospinal syphilis.

EMOTIONAL FACTORS IN THE REHABILITATION OF THE PHYSICALLY DISABLED.*

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For many years the problem of rehabilitating the physically disabled has been handled almost entirely from the physical point of view.

When, as a result of an accidental injury or disease, a man lost a leg or an arm, he was treated at a hospital and later supplied with a more or less workable artificial limb. If he had to spend a few weeks or months in the hospital, the chief concern of the physicians was to do the best they could surgically to correct his deformity. If the patient was indigent and there was a social agency cooperating with the hospital, their only concern was to purchase a serviceable artificial leg or arm for the patient. Little attention was paid to his occupation prior to the injury, whether or not the artificial limb would unable him to continue with his previous work, or whether the industry in which he had been employed would give him the same position that he had had before the injury occurred.

Still less consideration was given to the question how the disabled man would react to his new situation, and certainly no thought was given, at least from a practical point of view, to what the individual's emotional reaction would be toward his crippled body.

Gradually it has been realized that correction of orthopedic deformity alone is not sufficient to return the injured individual to the community as a self-supporting person.[1] In recent years vocational examiners and social workers have entered the field of rehabilitation of the physically disabled, and it is only a few years since psychiatrists and psychologists have begun to occupy themselves with problems of this sort. The work of V. V. Anderson in industrial psychiatry [2] is well known. His study of the personnel

* Read at the annual meeting of The American Psychopathological Association in conjunction with the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

of large industrial and commercial organizations from a psychiatric point of view has brought about remarkable results.

Since 1920 almost every state in the Union has established a special bureau to care for the physically disabled. In some states these vocational or rehabilitation bureaus are closely affiliated with the state department of education; in others they function as independent units of the state government. There are also a few which are maintained by private organizations with the aid of endowed funds. In the State of New Jersey the Rehabilitation Commission functions as a part of the State Labor Department and has branches, known as rehabilitation clinics, in several of the larger cities.

This report deals with the application of psychiatric principles in connection with the work of the New Jersey Rehabilitation Clinic maintained at Newark, New Jersey.

The objective of the clinic is to return to productive working capacity all individuals who have become physically handicapped as a result of congenital and acquired deformities and disabilities.[3] Disabled persons referred to the Rehabilitation Commission for help suffer from all degrees of physical disability. Some have minor defects which cause little incapacity; others are so severely and permanently disabled that to the casual observer they seem to offer only the slightest possibility for physical restoration to productive capacity. Not infrequently they have multiple disabilities of both physical and mental nature.

After the physical defects have been corrected as much as possible, the handicapped person is trained at the workshop maintained by the clinic, or arrangements are made to teach him some trade or occupation elsewhere which will not interfere with his particular deformity.

It is necessary to make a complete survey of the applicant's potential assets and liabilities in order to obtain a comprehensive picture of his case which will eliminate as much as possible any element of error or guesswork.[4, 5] One interview by a personnel representative with a single medical examination and a superficial appraisal by a vocational examiner are not adequate measures to judge the adjustment possibilities of the handicapped individuals.

In carrying out this work the following technique has been developed: When a client applies to this clinic for rehabilitation a complete history is taken by a trained social worker. The appli-

cant is then examined by the medical director, and undergoes such vocational and psychological tests as may be indicated in his case. A complete study of his personality make-up is made by a psychiatrist. His emotional reaction towards the disability and work is particularly investigated.

This mutual cooperation of several experts in their respective fields has been so fruitful that it has been decided to hold conferences at frequent intervals when each individual case can be studied and the best plan for rehabilitation worked out. The conference is composed of the medical director, assistant director of the clinic, vocational examiners, psychiatric social worker, psychologist, and psychiatrist. Attempts are made to diagnose the difficulties of the client, to evaluate his assets and to visualize his entire life situation.

Psychological elements not infrequently play a paramount part in the ability of the crippled individual to solve his adjustment problems.[5] Emotional attitude toward disability, work and life in general must be seriously considered if the attempts at rehabilitation are to have any measure of success. The total personality of the disabled person must be studied from all angles—physical, mental and social—in order to achieve a complete picture of the entire situation. Repeated examinations, extensive study and follow-up of these cases have shown that the predominant factor in failure to make a satisfactory social and vocational adjustment is not the physical handicap itself, but the neurotic attitude towards the disability. Numerous case histories indicate that there is no direct correlation between physical condition and vocational adjustment, but there seems to be a definite correlation between the emotional attitude of the handicapped person on the one hand, and vocational capacity and adjustment on the other.

The following case histories, taken at random from the files of the rehabilitation clinic, illustrate clearly the need for psychiatric approach to the problems of the physically disabled. Because of lack of space, the histories have been abbreviated as much as possible.

Case of H. K.—An 18-year-old girl, suffering from slight shortening of the left leg and mild scoliosis, was referred in 1933 to the clinic for rehabilitation. She received corrective orthopedic treatment, her shoe was raised on the left side, and a corset support was prescribed. The orthopedic surgeon re-examined her some time later and reported that her scoliosis was com-

pletely corrected and that she was in no need of further treatment. She walked with only a very slight limp.

It was then arranged by the vocational examiner to give her a course of commercial training at a business school. This was prior to the time when psychiatric service was established.

After two years of business school study, she turned to the rehabilitation clinic a complete failure. She was very much retarded in her progress and was unable to make the grade despite her conscientious efforts to do so. In the course, which ordinarily takes from nine to twelve months, this girl had been applying herself for two years. Unsuccessful in competition with her classmates, she became very unhappy, developed feelings of inferiority and fears that she would be unable to accomplish the necessary work. She attended classes under a feeling of compulsion and dislike.

Psychiatric examination revealed that the main problem of this girl was not her slight physical deformity, but limited intellectual development and emotional attitude toward the school. She had an I. Q. of 88, and with this dull average mentality, it was absolutely impossible for her to succeed in clerical work; therefore it was only natural for her to fail in the subjects which she had taken in the business school for two years.

Her mother had received practically no education but was ambitious for her daughter to gain by specialized education; she insisted and encouraged the daughter to go on with the business school training.

The girl was unable to meet the parent's desires and became emotionally upset, apprehensive, unhappy and maladjusted. She said, "My mother is disappointed that it takes me so long. It makes me feel bad. I am a terrible failure." She was ashamed to meet other classmates and friends, became extremely shy, sensitive and introverted, and had frequent crying spells.

After her case had been discussed at the clinic conference, and the reasons for her emotional instability and failure at business training pointed out, it was decided to arrange for her a period of employment training whereby she could gain experience and some security. She was placed at a home for crippled children where she could participate in the care of the children, and at the same time gain experience in the operation of a switchboard. She was interviewed some time later and appeared to be contented and making a satisfactory adjustment.

Without psychological and psychiatric studies, many haphazard attempts would have been made in the wrong direction at the expense of the rehabilitation clinic, or some other social agency, without helping the girl to achieve any degree of social adjustment.

CASE OF P. M.—This 48-year-old man was sent to the rehabilitation clinic because of almost complete loss of hearing following a head injury in 1927. Prior to this accident, the man was employed as a foreman in a factory and was considered a capable, steady, diligent and productive worker.

After the accident he was unable to adapt himself to any work, and when he came to the rehabilitation clinic the vocational examiner suggested training as a cabinet maker or carpenter in the workshop maintained by the clinic.

However, he failed to make any progress and was referred for psychiatric study. Our examination revealed that the man was suffering from traumatic psychosis. Following the head injury he had been unconscious for four days and gradually developed severe personality changes, had attacks of dizziness, irritability and irascibility, marked emotional instability, auditory hallucinations and an antagonistic attitude toward his relatives and employers which bordered on a paranoid trend.

This man was in urgent need of psychiatric care, and therefore all attempts at ordinary rehabilitation, to make him self-supporting, were doomed to failure. He was referred to the psychopathic ward of a local hospital for observation.

CASE OF A. M.—A 21-year-old crippled boy came to the rehabilitation clinic anxious to get aid in vocational training and placement. He had had infantile paralysis in childhood, which left him with residual signs involving the spine and left lower extremity.

According to the report of the vocational examiner, the boy had completed his senior class in high school and had expressed the desire to enter a business school for a course in secretarial study. Because of his poor marks in school, which ranged only from 70 to 75, it did not seem to the vocational examiner after a cursory examination, that the boy was fit for further study at a business school. Yet the psychologist at the rehabilitation clinic reported an I. Q. of 123, and the psychiatric social worker, after careful study of his home situation, was able to throw light on the causes of the boy's poor scholastic standing. With a history of physical disability from the age of two years, the boy had had to make a difficult emotional adjustment which was aggravated by constant friction and separations on the part of his parents, economic pressure and lack of social approval. He became sullen, stubborn, sulky and irritable, had no confidence in himself, and developed a constant feeling of fear and insecurity.

Following a few interviews with the psychiatrist, it was decided to adopt a course which would build up the boy's morale and confidence in himself. As an experiment, he was placed on a part-time basis in the secretarial school which cooperates with the clinic, and after a short period of observation, made such good progress that he was put on a full-time schedule.

CASE OF E. S.—A 45-year-old feeble-minded man had been self-supporting all his life despite retarded intellectual development. With an I. Q. of 50, he did fairly good work as an unskilled laborer in factories and on farms.

Recently he sustained a compound fracture of the right leg which caused slight shortening of the right lower extremity. Because of this disability he was referred to the rehabilitation clinic.

This man has made an excellent adjustment to his recent disability by taking it lightly with the idea that, at the present time, he is practically in as good condition as he has always been.

Because the man was eager to cooperate, and did not consider himself an invalid, it was comparatively easy to place him as a helper on a farm where he is reported as doing well.

This case illustrates that even under the present difficult economic conditions a man can be successfully rehabilitated in spite of serious physical defect and retarded mentality.

SUMMARY AND CONCLUSIONS.

1. The function of the New Jersey Rehabilitation Clinic is described.

2. Advantages of application of psychiatric principles to the work with physically disabled are pointed out.

3. The New Jersey Rehabilitation Clinic is the first of its kind to make a complete psychologic and psychiatric study of clients applying for rehabilitation, in addition to social and vocational investigation.

4. Psychiatric study at this clinic has contributed greatly towards the efficiency of the work in rehabilitating the crippled and disabled, and has proven to be of educational value to the vocational examiners and other personnel.

5. Because of early elimination of cases not adapted for ordinary rehabilitation, the new approach of the clinic has helped to save considerable money for the state, which by far exceeds the small expense required for the services of the additional personnel.

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INTERPRETATION OF THE ELECTRICAL ACTIVITY OF THE BRAIN.*

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The idea that electricity is intimately associated with the activities of the animal body is as old as our knowledge of electricity itself. We have only to recall the original observations of Galvani in 1786 which showed that the nerves and muscles of frogs could be stimulated by what was subsequently recognized as the electric current, and also the controversy between Galvani and Volta as to whether or not the animal tissues themselves generated this electricity, to realize this early association. However, in the enthusiasm for the development of the new science of electricity on a purely physical plane, these early observations were largely forgotten, and the study of electrophysiology was confined to a few physiological laboratories. This sequence was undoubtedly inevitable, since accurate observations of animal electricity could be made only after the fundamental principles of electrical energy had been established and technical methods for measurement had been devised.

During the intervening years, with the gradual improvement in methodology, a few fundamental principles became clearly established—first, that electricity could not only stimulate animal tissues, but also that it was actually generated by them, and that it was particularly associated with activity. A nerve or muscle must be alive to be a source of current. If we injure part of a cell and connect injured and uninjured regions with a sensitive galvanometer, current flows between them, and it is generated by the normal living tissue and not by the dead tissue. Furthermore, during activity such as the contraction of a muscle or the passage of an impulse along a nerve, there is an abrupt fluctuation in this steady flow of

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current. All of us, I believe, have heard of these so-called "action currents," which in physiological laboratories have proved invaluable tools for the study of nerve impulses and of muscular activity. Each living cell acts as a tiny battery which under conditions of physiological activity sets up a flow of electricity in the surrounding tissue. We must realize that this electrical current in the surrounding tissues is not identical with the nerve impulse, but is simply a by-product of activity, like the noise of an automobile. If enough cells become active at the same time and are so situated in relation to one another that their currents reinforce instead of neutralizing one another, the flow of current may be sufficiently intense to be detected at the surface of the body, provided our electrical instruments are delicate enough. The best example of this is the electrocardiogram which may be led off from the limbs, quite remote from the heart itself, but which reflects accurately the moment of activation of the various parts of the heart. The heart is a particularly favorable organ for such electrical manifestations, since it acts physiologically as a unit, and its various fibers contract in ordered sequence at nearly the same instant. By a study of the electrical record so obtained, the clinician may gain valuable information as to the sequence of activity in auricle and ventricle, and the relative development of various parts of the organ. The origin of a beat from an unusual position, or damage to cardiac tissue from blockage of part of the coronary circulation, is revealed by an abnormal pattern of electrical activity.

The electrocardiogram has so far been the chief contribution of electrophysiology to clinical medicine, and may serve as a model in our minds as we seek to interpret the meaning and possible practical significance of the electrical activity of the brain.

To return to the fundamental principles of electrophysiology, we must be perfectly clear at the outset of another basic concept. Although we may properly speak of muscle cells and nerve cells as electrical batteries, since they generate the electrical currents which we have just described, we must not be misled into thinking of the nerve fibers as electrical conductors analogous to the wires in a telephone system. Electricity can flow in nerve fibers, to be sure, just as it flows through muscles and skin when we register the electrocardiogram through electrodes attached to the arms, but this

flow through tissues is diffuse, and the current is not confined to the nerve fibers, as a current in the telephone system is confined to a metallic wire. Rather we must think of each bit of nervous tissue as itself a tiny battery or charged condenser, ready to liberate electricity as the wave of physiological activity which we call the "nerve impulse" passes along it. The nerve impulse has concomitant electrical manifestations and these electrical disturbances are probably part of the mechanism by which the nerve impulse advances from point to point along the fiber, but *the nerve impulse is much more than the mere passive flow of electricity along a conductor.* The nerve impulse has been aptly compared by Keith Lucas to the burning of a train of gun-powder, with the liberation of energy at all points along the train. In the nerve the energy so liberated is electricity as well as heat, but the fundamental analogy is valid. The electrical discharge tells us when the wave of activity reaches a particular point, and also tells us something of the nature of that activity, but the wide difference between the velocities of conduction of electricity and of the nerve impulse should make us immediately aware of fundamental differences between the two.

We must avoid thinking of the brain as a mere reservoir of energy—electrical energy perhaps—which because of its very content of electricity might tend to discharge when opportunity offers. We cannot hope to measure "nervous energy" in terms of electrical volts and amperes. Such analogies are purely specious and lose sight of another fundamental fact, which is that *the ease with which a nerve or muscle cell may be stimulated to activity by an electrical current or any other stimulus bears only a distant relationship to the amount of electricity which will be liberated when the cell becomes active.* "Nervous energy," in the popular sense, should be thought of in terms of how readily various parts of the nervous system may be called into action, rather than how much electricity is generated as a result of that activity. It is the same distinction that we make between how hard it is to pull the trigger of a pistol and what may be the velocity of the bullet which it fires.

The electric current generated by a nerve impulse is minute and brief. Its potential is measured in terms of thousandths of a volt

and its duration is about a thousandth of a second. A single nerve impulse in a single fiber can readily be detected and studied by means of modern amplifiers, but even with the best of instruments this is possible only if the nerve can be dissected free from surrounding tissues and laid directly on our recording electrodes. Even the activity of the brain as a whole only yields potentials measured in terms of millionths of a volt when we apply electrodes to the outside of the human head. Fortunately, our amplifiers are now competent to deal with such tiny electrical fluctuations, and, as Adrian has put it, the introduction of modern amplifiers has been for electrophysiology what the introduction of the compound microscope was to anatomy. Small as these currents are, we can now record them, measure them, classify them, and undertake to associate various types and patterns of electrical activity with other activities of the organism. We shall describe a few of these patterns in more detail in a moment, but I wish to emphasize the fact that they represent the sum of the activity of myriads of individual cells in the brain. In fact, until Hans Berger in 1929 showed experimentally that it was possible to record significant electrical patterns from the human head, most electrophysiologists had refrained from even making the attempt, so sure were they that activity of the individual cells must necessarily be so disorganized and scattered in time and direction that they would cancel one another out completely, as far as any external detection was concerned. The fact that a pattern of total activity can actually be detected implies an organization of the activity of many brain cells. We know from anatomical studies that in the gray matter there is a definite anatomical orientation and grouping of cells into recognizable layers, but the degree of physiological organization of activity which we can infer from actual electrical records was not suspected. In a sense, therefore, we are faced with a new phenomenon—the physiological organization of activity of cortical cells as indicated by their electrical activity; and, for the interpretation of the pattern which we find, we must start from the very foundations of empirical observation. Our guiding principles are that the electricity is undoubtedly generated by individual cells, that external electrical fluctuations indicate fluctuations of physiological activity, and that we must be dealing with an organization among myriads of individual elements.

We might add that laboratory studies have shown quite conclusively that the electroencephalogram, as we call the record of electrical activity led off from the head, depends upon cortical activity. It is a type of activity characteristic of gray matter rather than white matter, and the same kind of activity can be detected from gray matter deeper in the nervous system—in thalamus, cerebellum, and spinal cord—but because of its favorable anatomical situation near the surface it is the cerebral cortex whose activity registers in our instruments. This characteristic activity of gray matter tends to be more or less clearly rhythmic, and its rhythm is relatively slow compared with the very brief duration of the impulse in a nerve fiber. Furthermore, there is good evidence that this rhythmic activity may originate spontaneously in the cortex or other centers, in absence of any recognizable external stimulation. Nerve impulses reaching the centers may, however, significantly modify the activity already in progress in those centers, and likewise activity may be modified by changes in the physiological environment, such as lack of oxygen, the presence of drugs, and so on.

What are some of the patterns of electrical activity exhibited by the human brain and what empirical meaning can we give to them? Young as this type of study is, a few generalizations now seem well established—thanks to the work of such investigators as Berger, Adrian, Kornmüller, Jasper, Loomis, Gibbs, and many others. Fig. 1 shows samples of normal records taken from several different individuals under standard conditions and illustrates what we may consider a range of normal variation. All of these were taken from the occipital region, but we may say at once that all parts of the cranium yield fundamentally similar patterns. To be sure, the large, smooth, ten-a-second, so called " alpha " waves so prominent in the upper record are likely to be less prominent and less plentiful at the top of the head or in the frontal regions, while the smaller, faster waves at 20 to 30 a second tend to be slightly more prominent in the latter regions. Animal experiments by Kornmüller [8] suggest that more or less typical patterns may be assigned to particular anatomical fields and correlated with the type and arrangement of cells found there. The intact skull and scalp, however, obscure any sharp boundary zones which may exist

in the human brain, and the similarity of records from different parts of the head is more impressive than their differences.

Normal human adults vary between the two extremes illustrated in the figure—on the one hand, an almost continuous exhibition of ten-a-second waves as long as the eyes are closed, and, on the other hand, no alpha waves whatever. Of the normal individuals we have examined, about a half of them show clean-cut alpha waves more than half of the time; about one-quarter yield them more than 75 per cent of the time; while another quarter are less

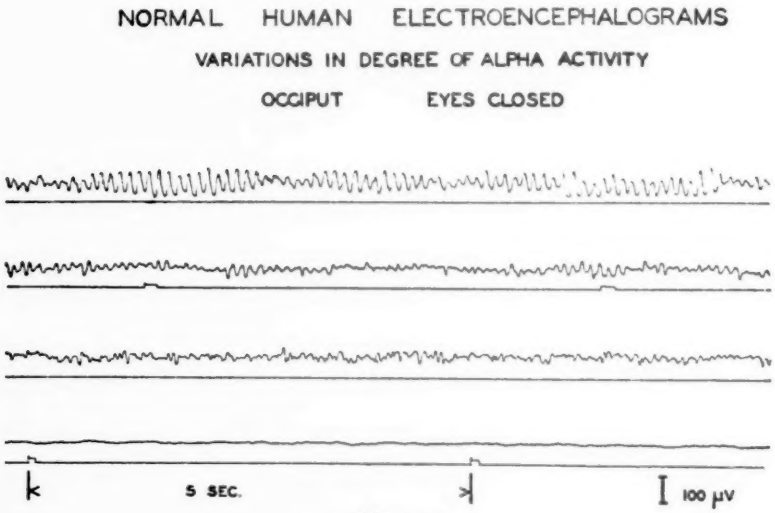


FIG. 1.

than 25 per cent. It is interesting to speculate with what other characteristics of the individual—perhaps even psychological traits—this difference of electrical behavior may be correlated. Lemere [9] makes the interesting suggestion that individuals of the manic-depressive type tend to have good alpha waves, while the schizophrenics do not, but we must still regard any such suggestions as tentative working hypotheses. Our own studies, not yet published in detail, indicate that there are too many exceptions to allow us to be satisfied with the simple rule as here stated. We personally feel confident, however, that a very significant relationship does exist between the presence of alpha waves and at least one basic psychological trend.[11]

To return to well-established facts, we do know that presence or absence of the alpha rhythm is not correlated with intelligence. In children less than 10 years of age, the rhythm tends to be slower than in adults, but may nevertheless be very clearly defined. Although different individuals differ widely from one another in respect to the alpha waves, and also other features, such as voltage, general pattern, and sharpness or roundness of wave-form, a given individual tends to reproduce his own record on successive tests. Minor variations do occur, and we must not think of the electroencephalogram as having the individuality of a fingerprint. We can more legitimately compare it to the individuality of a person's voice, which in spite of differences in loudness and tone or the words which he may speak, we can nevertheless recognize with a fair degree of certainty. It is also a matter of some interest that identical twins have so far (14 pairs) yielded closely similar patterns [3] —as similar indeed as their physical appearance or their voices. This confirms the idea of a fundamental organic significance of the individual electroencephalogram.

Just as individuals differ from one another in respect to the amount of alpha rhythm which they exhibit, so the amount of alpha activity varies from time to time under different circumstances. Opening the eyes is a sure way of checking it, at least momentarily. The onset of drowsiness will also inhibit it, and any sudden unexpected stimulus which startles the subject, or sometimes conditions of embarrassment or apprehension, may do the same. It appears to be a labile indicator of something, but as yet we know not what.

Considering extremes of activity and depression, we find opposite characteristics in the electrical record. Overactivity of a pathological sort, illustrated by strychnine poisoning in animals, and the grand-mal epileptic seizures seen in humans [4] gives a high-voltage record full of sharp spikes in quick succession. The electrical activity tends to build up to a climax in parallel with the muscular spasms or clonic jerks and to show a period of very slight activity during the relaxed stupor following a seizure. In general, overexcitation of the cortex seems to be revealed by quick sequences of sharp spikes at relatively high voltage.

States of physiological depression are associated with slow irregular waves at perhaps two to four a second. These waves may attain as high voltages as the epileptic spikes, but differ completely from them in their slow, rounded contours. The various depressed states that show slow-wave activity include not only anesthesia,[5] particularly with the barbiturate drugs, but also cortical anemia,[4] or anoxemia from any cause, hypoglycemic shock induced by insulin,[6] and finally normal sleep (Fig. 2). The most extreme case that we

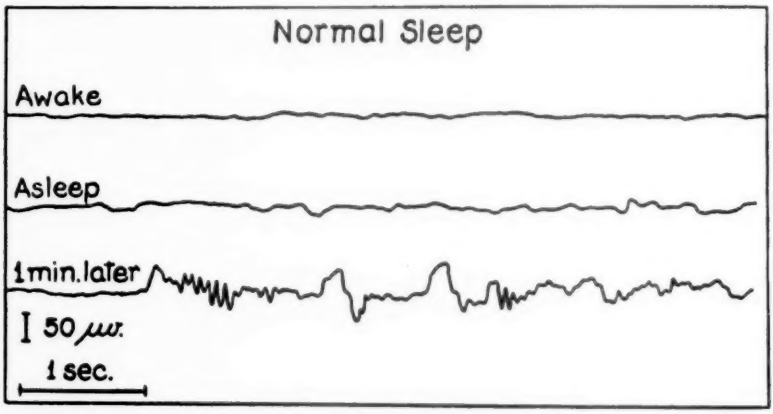


FIG. 2.

have studied personally was a long-continued coma following carbon-monoxide poisoning (Fig. 3). Petit-mal epilepsy is associated with an interesting and characteristic combination of the sharp high spike of overactivity alternating with the slow, rounded dome of depression.[4] We believe that it is significant that all of these depressed states are associated with mental confusion or complete loss of consciousness.

It is too early to attempt to interpret in terms of particular cells or cortical layers these various types of activity, which we have tentatively designated as the normal, the overactive, and the depressed. Neither have we time to review in more detail the many important and significant observations from many laboratories which are laying the groundwork of empirical observation and physiological analysis. In time, we may understand the relation of these

electrical events to states of central excitation and inhibition and perhaps even to consciousness. Working hypotheses are necessary as we advance, but our theoretical interpretations must not violate established principles of neurophysiology, and our generalizations must rest upon carefully controlled empirical relationships.

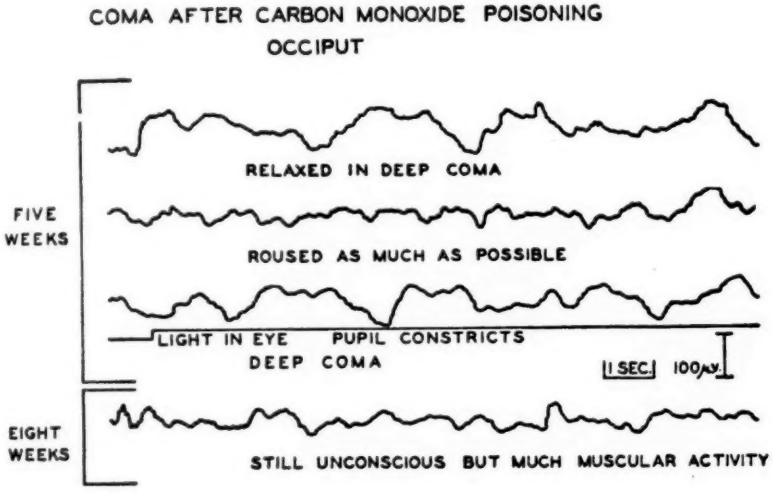


FIG. 3

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ELECTRICAL SIGNS OF CORTICAL FUNCTION IN EPILEPSY AND ALLIED DISORDERS.*

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Psychiatry and neurology owe a great debt to Dr. Hans Berger, director of the Psychiatric Institute and Hospital at Jena, who demonstrated to the world, after years of careful scientific work, that it is possible to obtain important electrical signs of the functional condition of the human brain from electrodes applied to the unopened skull. The discoveries made possible by the new technique of electroencephalography not only give us new insight into dynamic aspects of normal brain function but also make possible the observation of some of the phenomena associated with the abnormal brain function accompanying many neurologic and psychiatric disorders.

We have been using the method of electroencephalography in the routine examination of patients admitted to the Emma Pendleton Bradley Home for over two years and have made supplementary studies on selected patients from neighboring institutions. A total of 430 examinations have been made on patients with various neurologic and psychiatric disorders, 115 of which were on patients diagnosed as suffering from epilepsy. Two hundred and sixty control experiments have been conducted on normal human subjects with a number of animal controls (cats); in the latter it was possible to obtain the records from electrodes placed directly in contact with the cortex. The present report is concerned with the

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contributions that these studies have made to our understanding and clinical treatment of epilepsy.*

Schon and Kornmüller (1932) (reference in Kornmüller [1]) were the first to describe brain potentials of a particular form occurring in experimental epilepsy in animals as induced by drugs or hyperventilation. Fischer [2] and Fischer and Löwenbach [3] report additional observations on large explosive potential variations in the cortex of the rabbit induced by similar methods, and also by direct electrical stimulation of the brain. Adrian and Matthews [4] report an interesting analysis of seizure waves in the cortex of the rabbit brought on by drugs. These waves were of exceptionally large amplitude and were conducted over the surface of the cortex at a definite velocity of about 10 to 15 cm/sec. They were apparently conducted from foci to adjacent regions and occasionally were sufficiently large to involve the entire cortex. An interesting description of the significance of these epileptiform waves and their spread from one region to another is given in Adrian's summary before the Royal Society in 1935.[5]

Kornmüller [1] presents a rather complete study of various convulsive states in different cortical and subcortical centers in the rabbit and monkey with convulsions being brought on by various drugs, mechanical irritation, excessive afferent stimulation and hyperventilation. He also presents an interesting discussion of the application of these findings to various theories of epilepsy. An abstract of his findings follows:

(1) Seizure waves occur as a result of excess stimulation of a given region or as a result of changes in the excitability of cortical tissue due to drugs or to changes in metabolic state such as those occurring in hyperventilation. (2) Electrical activity in the convulsive condition in terms of electrical energy recorded is increased as high as 20 times the normal level of activity. (3) The sequence of changes in a severe convulsion appear to be as follows: (a) Changes in the spontaneous activity often characterized by an increased frequency and amplitude. (b) Large rhythmic slow discharges often composed of one or more spikes combined with slow smooth waves regularly repeated at frequencies from 2 to 5 per sec. (c) The frequency pattern of the slow discharges changes during the course of a seizure, the waves tending to be of longer duration and lower frequency towards the end. (d) The

* Interpretive principles will be based upon the results of many other investigators including Dr. Howard Andrews, Dr. Margaret Rheinberger, and Dr. Philip Solomon of our laboratories. Dr. William Hawke also took part in some of the work with epileptic patients.

rather abrupt cessation of the electrical activity is followed by a period of abnormal quiet which he has called the period of "exhaustion." This is followed by a slow return to the normal brain activity for a given region. The length of the "exhaustion" period is proportional to the severity of the "explosive" period. (4) An epileptic state beginning in a restricted cortical area tends to be definitely confined to this area. The border of a new architectonic area seems to act as a barrier to the spread of the seizure which, however, may be passed if the activity in the epileptogenous zone becomes sufficiently great. The seizure waves may pass synapses through which normal impulses do not pass. (5) Some indications are given that the seizure waves from different brain areas vary somewhat in accordance with the architectonic structure differentiating these areas. Seizures elicited in a variety of ways give the same type of waves from a given brain region, although they may be varied by changing the metabolic state of the cortex. (6) The use of a drug producing generalized convulsions shows that different brain areas have different thresholds, some being discharged much more easily than others. (7) One center may become a pace-maker for epileptic discharges in other parts of the brain. (8) Seizure waves were also observed in the subcortical hypothalamic nuclei. (9) Some correlation was found between the seizure waves from the precentral region and the rhythm of clonic movements in the forearm as determined by simultaneous records of brain potentials and muscle action potentials in the rabbit. (10) Isolated seizure waves were recorded from the precentral region of the rabbit in the early stages of hyperventilation, the periods between these sporadic waves showing a fairly normal type of brain activity.

Due to the marked increase in magnitude of the electrical potentials developed at the cortical surface during an epileptic attack it is very easy to obtain a rough indication of their nature through the unopened skull in man if there are not too many artifacts introduced by the convulsive movements. Berger [6, 7] found that the sequence of events in a grand mal attack in man was similar to the description given by Kornmüller for experimental attacks in animals. Foerster and Altenberger [8] obtained very large rhythmic potentials of similar nature by recording directly from the cortex in man during a brain operation. The work of Gibbs, Davis, and Lennox,[9] and Gibbs, Lennox and Gibbs [10] has served to establish the general clinical value of the E. E. G. in epilepsy. Sequences of periodic discharges of a characteristic form signalize the approach of an attack, persist throughout the attack, and occur sporadically in "larval" forms during the periods between the overt clinical seizures. With multiple recording systems permitting the simultaneous observation of the electrical activity from several

restricted head regions, a standard technique developed by Jasper and Andrews [11, 12, 13] and applied extensively to epilepsy by Jasper and Hawke,[14] it is possible to detect local epileptogenous zones and to follow the spread of a seizure from one region to another. This confirms in man the type of spread described by Kornmüller and Fischer in animals. The more practical significance of these findings will be summarized as they appear to shed light on certain clinical problems related to epilepsy.

DIFFERENTIAL DIAGNOSIS.

Gibbs, Lennox, and Gibbs [10] have stated that the form of the seizure waves in petit mal attacks is definitely pathognomonic for petit mal epilepsy. No such regularly repeated sequence of waves has been reported by Berger from his studies of other pathological conditions and the form and frequency of some of the seizure waves obtained by Kornmüller in animals were similar to the spike and slow wave sequence obtained during a petit mal attack. Jasper and Hawke [14] compared records from 55 epileptic patients with records taken under the same conditions from 105 patients with various disorders of the central nervous system not diagnosed as epilepsy. The spike and slow wave sequence at 2-4 per second was found characteristic of the E. E. G. at some time during most petit mal attacks with rather wide variations in form throughout the attack and also with marked differences between individual patients. In some cases a very mild attack showed only smooth waves at about three per second of about the same form as the normal alpha waves which occurred at 10 per second between seizures.

It was found, however, that the spike and slow wave sequence did appear in patients who had not been diagnosed as epileptic from clinical observations, that is, they did not have paroxysms of convulsive movements or loss of consciousness. This raises the question as to whether to base diagnosis upon clinical criteria or upon the E. E. G. The discovery of a similar wave form in a group of behavior problem children [15] who had not been suspected of epilepsy previous to the E. E. G. examination is an example of this difficulty. These children did show many of the personality deviations and mental conditions often associated with the epileptic

personality, but should this be called epilepsy? There is also the large spike and slow wave form described by Travis and Malamud [16] in two stutterers during a spasm in speech. Should these cases also be called epileptic? We are here dealing with pathological conditions of the brain quite similar to those found in patients with paroxysmal loss of consciousness or convulsive movements but we feel that, at least at present, the diagnosis of epilepsy cannot be made upon the basis of the presence of seizure waves in the E. E. G. We feel that it is better to base the diagnosis of epilepsy upon clear clinical as well as electroencephalographic evidence and to speak of these disorders functionally associated with epilepsy by the electroencephalographic findings as *allied disorders* rather than true epilepsy.

On the other hand in our experience all cases of epilepsy (so diagnosed by the usual clinical criteria) have shown clearly recognizable seizure waves of some form in the E. E. G. during a seizure, and many cases showed them even between attacks. We have had seven patients referred for examination because their epileptiform attacks were questionably hysterical rather than genuinely epileptic. In two of these patients we found the E. E. G. within normal limits when taken between attacks and we were unable to induce a seizure with hyperventilation. This evidence is not conclusive, however, since in some patients with genuine grand mal attacks we have also found the E. E. G. within normal limits between attacks although marked changes are ordinarily easily induced by hyperventilation. A third patient was reexamined until we were able to get a record throughout one of her typical " spells." The E. E. G. showed only those changes typical of a normal excited individual so that we felt justified in giving the diagnosis of hysteria on the basis of the E. E. G. findings. A very cleverly simulated attack might, of course, produce movement artifacts closely resembling seizure waves but we have not seen such artifacts which could not be distinguished from seizure waves if adequate controls are taken during the examination. The four other cases showed sporadic seizure waves even between seizures.

The Question of Surgical Intervention.

Six different methods of localizing a restricted region of the head beneath which seizure waves appear to start (epileptogenic

foci) have been described by Jasper and Hawke (*op. cit.*). Localizing signs were obtained in 13 out of 18 petit mal and in 20 out of 37 grand mal patients. They report also three cases in which seizure waves were picked up almost continually over a traumatic scar but not from other parts of the head. These patients were free from seizures at the time of examination. Since these waves were characteristically different from the seizure waves in other types of epilepsy, it was suggested that the form of the wave as well as its localization may be important in questions of surgical intervention. It is expected that the E. E. G. will add to the list of considerations cited by Penfield [17] as important in deciding on the surgical treatment of epilepsy, but we have not as yet had the opportunity to validate this application of the electroencephalogram. Localization is, of course, limited to those regions of the cortex lying subjacent to the head surface since only indirect gross indications can be obtained of deep lying foci.

Conditions Between Clinical Seizures.

Mental and emotional changes in some epileptic patients during the periods between seizures have long been recognized from clinical observation. It has been assumed that these characteristic changes, when they did occur, were in some way related to the pathological conditions which occasionally find paroxysmal overt expression or that they were sequelæ of the traumatic effects of the seizure itself. It has been difficult to explain, however, the apparent lack of correlation in many cases between the frequency and severity of the attacks and the more or less chronic personality changes or dementia noted between attacks. The E. E. G. provides a sensitive indicator of brain function during those periods when there is no clinical evidence of a convulsive state.

In epileptic dementia Berger [18] reports that 11 out of 14 cases showed large amplitude slow waves between attacks. Three cases having minor psychotic symptoms showed only occasional large slow waves in the E. E. G. In deteriorated epileptics Berger [19] found large amplitude slow waves (about 230 milliseconds, equivalent frequency 4-5 per second) which he contrasts with the *low* amplitude slow waves found in congenital idiots. Berger does not state whether the slow waves found in epileptic patients between

attacks resemble seizure waves or the irregular slow waves such as are found in other pathological conditions of the cortex.

In our own cases 11 out of 12 psychotic epileptics showed large amplitude slow waves between attacks. Some of these waves were of the spike and slow wave form but they were for the most part sudden large spikes, regularly repeated large smooth slow waves, or irregular disorganized rhythms. In all of these 11 cases there was almost continuous rhythmic activity of some type and the amplitude of the slow waves could be readily increased (3 to 10 times) by a short period (1-2 minutes) of hyperventilation even though a seizure was not produced. A certain amount of relatively normal record was also obtained. The ratio of normal activity as opposed to a pathological type was roughly proportional to the severity of the mental disturbance.

Pathological slow waves of large amplitude were also found between attacks in 13 deteriorated epileptics, corroborating Berger's findings with this type of case. We found that these patients were also very sensitive to hyperventilation which caused large, irregular potentials sometimes as high as 1000 microvolts after only one minute of hyperventilation. When these E. E. G. changes were present without a clinical seizure, mental confusion was often present.

In seven petit mal patients and in three grand mal patients who were quite free from any signs of intellectual deterioration or mental disorder, even though some were subjected to severe and frequent clinical outbursts in the overt seizure, the E. E. G. showed that they were relatively free from signs of sub-clinical epileptic disturbance between attacks. It is suggested therefore that the persistence of the pathological hyperactivity between attacks may be as important in determining intellectual deterioration and mental disorder as the frequency and severity of clinical seizures. The brain may be able to stand periodic paroxysms if allowed time to recover between attacks better than the continual bombardment by relatively less severe epileptiform activity. Furthermore, it is not surprizing that mental and emotional disturbances should characterize the epileptic personality between fits when we see the disorganized brain waves and momentary sub-clinical fits revealed in the E. E. G. of patients between overt seizures and even in some patients who have been free from overt seizures for many years.

The following case reports will illustrate the use of the E. E. G. in detection of inter-seizure epileptiform activity:

CASE 1.—A slightly built 7-year-old girl of pleasing appearance.

History.—Birth was normal at term with some complications due to a mild toxemia. Delivery was said to have been normal but the child was in poor condition for several days with cyanosis and frequent convulsions of the right side. From the age of 18 months she had grand mal convulsions most marked on the right side, occurring at intervals of from 1 to 5 months. Family and social histories are negative except that two paternal aunts are said to have had convulsions in childhood. There were a number of upper respiratory infections which seemed to be precipitating factors in some of her convulsions. Physical examination and laboratory studies were negative. Roentgen encephalographic studies showed no evidence of local or general atrophy. Since her treatment with phenobarbitol beginning in April 1935 (½ grain 3 times a day) she has been completely free from clinical attacks. Psychometric examination indicated an I. Q. of 105. School progress has been poor. Teachers report patient is "dreamy" and cannot concentrate.

E. E. G.—Examination after the patient had been free from any clinical attacks for 18 months showed almost continuous local seizure waves in the left precentral region. The record from other regions was essentially normal except that slow smooth potentials at 3 per second were very easily produced with only one minute of light hyperventilation.

CASE 2.—A well-developed girl of 11 years.

History.—The first convulsive attack was observed in July 1935. Five weeks later she had four generalized grand mal attacks in one day. Since then she has had frequent grand mal attacks usually occurring at night. She had been a very bright girl doing excellent work in school. More recently psychometric tests gave ratings on the same type of material at different times from I. Q. 86 to 109. During the period covered by these examinations she was having grand mal attacks at night three or four times a month. Her mental processes showed marked confusion, loss of memory, and lack of control, which were variable from day to day. Performance during psychological tests appeared to be arrested periodically by marked confusion.

E. E. G.—In records taken on a day during which the patient showed a more or less continuous state of confusion, large slow smooth potentials (300 to 400 uvs.) at a rate of about three a second were obtained, chiefly from the precentral and frontal regions with some occasionally from the occipital region (Fig. 2A). On one of her better days (when she showed less confusion and irritability) the E. E. G. showed lower amplitude potentials occurring regularly at about 7 per second (Fig. 2B). A brief period of hyperventilation produced a marked increase in the amplitude of the slow smooth rhythms with an occasional spike and slow wave form appearing, although no clinical seizure was induced.

FIG. 1.—Local and Generalized Seizure Waves in a Petit Mal Case. Sample A represents fairly normal brain potentials from bipolar leads to the left frontal (1), central (2), parietal (3), and occipital (4) head regions previous to an attack. Maximum amplitude of alpha waves is about 50 microvolts.

Sample B is taken from another portion of the same record during an attack with the same leads but reduced sensitivity. Note the synchronization of activity in all regions even though seizure waves differ in form. The maximum amplitude is seen in the occiput at about 500 microvolts.

Sample C was taken from a record on the same patient a week later at a time when she was irritable and periodically a little confused but did not lose consciousness. Simultaneous records from bipolar leads to the left frontal (1), central (2), and occipital (3) head regions are shown. At this time seizure waves appeared interspersed with normal alpha rhythm from the occipital region without spreading to other parts of the cortex. Calibration lines at the right indicate 50 microvolts.

FIG. 2.—Epileptoid Conditions Between Attacks (Case 2 in Text). The above record (A) was taken from monopolar leads to the right occipital (1) and to the right central (2) regions when the patient was showing marked confusion, irritability, and other epileptic personality changes. The record below (B) was taken with the same leads on this patient four days later when she was much brighter, better oriented, and less irritable. Calibration lines indicate 200 microvolts.

Epileptoid Conditions.

It is not easy to draw the line between pathological conditions which we might call genuinely epileptic from the clinical point of view and those states which appear to be less severe manifestations of the same type of disordered brain function. The following case reports will serve to illustrate, in children, the type of cases which are not usually diagnosed as epilepsy according to clinical criteria (loss of consciousness and convulsive movements) but which represent epileptoid conditions:

Case 3.—A 10-year-old boy of French Canadian parentage admitted as a behavior problem.

History.—For two years prior to admission the patient had been "nervous" and slept very poorly; there was an indefinite history of twitches and sleep walking. School progress had been poor and truancy a problem. Irritability and temper tantrums have been frequent. Patient complained of frontal headaches, sleeplessness, and nervousness. Mother was mentally deficient and had been subject to frequent grand mal seizures. Physical examination showed only somewhat sluggish reflexes and an undescended testicle. Psychometric examinations showed an average I. Q. of 80. No grand mal or petit mal attacks have been observed.

E. E. G.—Records were characterized by short bursts of large 3 to 4 per second smooth potentials more frequent in the frontal and precentral regions of the head. At times all regions would show 3 per second spiked potentials resembling very much those seen in a genuine petit mal attack although there was no apparent loss of consciousness or physical signs of convulsive activity.

Case 4.—A well-developed and well-nourished boy of 12 years admitted as a behavior problem.

History.—Patient had always been a difficult child due to stubbornness, irritability, disobedience, and destructiveness. Grand mal convulsions had occurred from the age of 18 months to 3 years. No convulsions have occurred since this time (9 years). Three of the siblings had seizures in infancy and there are a number of paternal relatives reported to have been epileptic. In school the patient was retarded about one grade below mental age grade expectancy. Special difficulty was shown in arithmetic. Behavior and learning ability in school were reported as quite variable. Teachers complained of "stubborn" behavior and fluctuating temperament. General intelligence according to verbal and performance tests was retarded, I. Q. 85. Physical examination showed no evidence of neurological disorder.

E. E. G.—A fairly normal record was obtained on his "good" days except for a few large smooth slow potentials breaking into the normal rhythm from the occipital region. Records taken on his "bad" days showed trains of 3 to 10 large smooth potentials at 3 to 4 per second throughout with only

rarely any normal alpha rhythm. These slow rhythms were more regularly present in the parietal and occipital regions but were present occasionally in all regions.

The E. E. G. in these cases differs from that obtained during a seizure which is accompanied by loss of consciousness in several important respects. (Figs. 1 and 2.) (1) The slow waves which break into what would be otherwise a normal record are often only two to four times the magnitude of the normal alpha waves as compared to the seizure waves of 10 or more times the alpha magnitude during a generalized fit. (Fig. 1, C.) (2) Seizure waves in a generalized fit repeat each other in a very regular sequence at about three per second while they may appear also as single waves or in irregular sequence in the epileptoid conditions. (Compare Fig. 1, B with C.) (3) In our experience large seizure waves occur in close synchrony from all head regions at the height of any attack which is accompanied by a loss of consciousness (Fig. 1, B), while they may be restricted to one or more head regions when they produce only minor changes in mental activity or local convulsive movements (such as in the Jacksonian attack which remained confined to the hand). Local seizure waves which do not spread from the occipital or parietal regions may produce momentary confusion in thinking, garbled speech, etc., without involuntary movements unless the precentral region is involved. Likewise seizure waves confined to the frontal region may result in no involuntary movements. However, in some patients, the precentral as well as all other regions seem to be involved in seizures with a loss of consciousness even though no clonic movements can be detected. (4) The large slow waves in epileptoid states often occur with some normal alpha waves superimposed upon them while no normal rhythmic activity can be seen simultaneously with the seizure waves in a major fit.

With Relation to Anti-Convulsive Therapy.

Lennox, Gibbs, and Gibbs [20] have shown that luminal and sodium bromide decrease the amplitude and number of seizure waves in petit mal epileptic patients. We have observed a decrease in the amount of epileptiform activity in the E. E. G. of patients not subject to generalized fits following the administration of luminal,

sodium bromide, or the use of the ketogenic diet. The E. E. G. provides a very sensitive check on the effects of such treatment. In some cases it has resulted in the continuation of sustaining doses of luminal when it would otherwise have been withdrawn because of the absence of fits over a long period of time. In other cases it has suggested the use of anti-convulsive therapy in the treatment of patients who were previously not considered as having epileptoid disorders.

Discussion.

In order to gain an understanding of the functional significance of these curious electrical signs of cortical activity we must alter our classical conceptions of the normal function of the brain. The cerebral cortex can no longer be considered as only an intricate network of pathways and switches by which an impulse which starts at the sense organ is finally conducted to its destination. Sensory impulses arriving at the cortex are thrown into a pool of dynamic excitatory processes where they may or may not make an impression on the total pattern of spontaneous activity already present. It is this background of continuous spontaneous activity as varied by pathological conditions and normal excitatory processes that forms the basis for the electrical brain waves we can record through the skull.

Once we have adjusted ourselves to the idea of this centrally maintained activity we meet with another blow to our classical concepts. Thinking of the cortex as composed of several million separate cells, organized, it is true, into two hundred or more structural areas, but still made up of units, how is it possible to get anything but infinite complexity in the records taken of the electrical activity of these units from electrodes applied to the surface of the head? We can understand how it is possible to pick up the potential changes set up across the body by the simple unified action of the heart in the electrocardiogram. If we should have two hundred or more completely *independent* hearts the task of analyzing the resulting electrocardiogram would appear hopeless. We find to our surprize, however, that when we place two hundred brain areas between our electrodes as does Berger with the forehead-occiput leads, we often get large smooth regular rhythmic waves at about 10 per second, the alpha rhythm, with much smaller waves

superimposed at about 25 per second, the beta rhythm, and a bare suspicion of some very small potentials at still higher frequencies. It is true that some normal individuals do not show such a simple picture; either they have very small and jagged alpha waves or they may show a predominant beta rhythm or may even give only a low fuzzy line with only occasional groups of clear alpha or beta waves. In any case the pictures obtained are much more simple than one would expect from our knowledge of the multitudinous units composing the brain. This is due to the fact that these cells do not behave as independent units but tend to become organized in rhythmic synchrony, one group often acting as a pacemaker for coordinated waves of activity covering a large region of the cortex. (Adrian.[21]) It is only by virtue of this delicate organization of activity that potentials are developed on the cortical surface which are large enough to detect through the skull. Not only one region, but widely separated regions in both hemispheres may show a high degree of synchrony in rhythmic activity indicating a closely integrated organization of cortical and sub-cortical function. Consequently such electrical signs serve as important indices of *brain organization* and undergo changes with some processes which tend to upset the normal characteristics of this integrated activity.

If we are to attribute functional importance to these electrical signs of brain organization, how are we to account for the highly differentiating or localized functions of the brain on the basis of this apparent mass activity? The fact is that the electroencephalogram gives indications also of the differentiating activity of cortical areas and the lack of complete synchronization of cell discharges in one area under normal conditions. With multiple simultaneous recording from pairs of electrodes close enough together to restrict the region of the cortex from which potentials are obtained, it has been shown (Jasper and Andrews[13]) that it is possible to differentiate between the spontaneous activity of bilaterally homologous regions as well as from the frontal, central, parietal, and occipital regions of one hemisphere. It was found that there are certain rather characteristic differences in the pattern of activity from different parts of the head, the largest and most regular alpha rhythm coming from the occiput, beta rhythms being more characteristic of the precentral and frontal regions, and in some normal

subjects very little rhythmic activity could be detected except in the posterior head regions.

In many normal individuals, for example, no detectable alpha rhythm could be recorded from the frontal region simultaneously with the presence of large regular alpha waves from the occiput. Does this mean that the frontal region was silent? Probably not, since the frontal region is also found to be in continuous activity when it is possible to place electrodes directly on the cortex. It probably means that the *organization* of activity is such in the frontal region that the synchronized discharge of groups of cells is not normally great enough to develop sufficient voltage for detection through the skull.

The absence of detectable electrical activity may indicate a true "inhibition" or depression of cortical function, but in most cases it probably means a greater independence or a more highly differentiated activity of units. The fact that these regions are, however, capable of massed synchronized discharge is shown by the effect of certain drugs or pathological processes which will increase the number of simultaneously active cells to such an extent that very large potential disturbances appear also in the frontal region. This is the condition characteristic of the epileptic attack. Also, the potentials from the occipital region, which may be normally about 50 to 75 microvolts, may increase to 10 or 20 times this magnitude under pathological conditions which throw practically all of the cells in a given region into the synchronized beat. The degree of synchrony normally observed, therefore, is far from being the maximum possible in truly mass discharge, thus showing a relatively high degree of individualized function under normal conditions. There is also some evidence that the individual units are not all continuously active under normal conditions but the observed continuity is maintained by small groups of cells acting in relays causing a moving focus of activity over a prescribed region (Adrian and Yamagiwa,[22] Adrian [21]) thus giving the cells periods of rest which they would not have in the mass discharges of the epileptic process. The period of "exhaustion" with the depression of electrical activity following a severe seizure indicates that, at the height of a seizure, the cortex is not only in greater synchrony but more cells are simultaneously activated (fewer cells at rest) than under normal conditions.

Brain mechanisms in epilepsy are thus seen to be merely extreme variations of the mechanisms of normal brain function. It is often difficult to draw the demarcation between normal and pathological degrees of synchronous mass discharge in cortical neurons. There appears to be a continuous distribution of individuals with the tendency for synchronized autonomous cortical activity ranging from the severe grand mal patient through the various degrees of petit mal to the borderline epileptic states (which may not be accompanied by genuine clinical attacks but produce only personality changes) through the so-called normal individuals with a good alpha rhythm to the small group of normal individuals who show practically no detectable alpha rhythm. We might hazard the suggestion that the characteristics of the "epileptic personality" may be of importance in the determination of the significance of normal individual differences in the E. E. G. Conversely, the tendency to synchronized mass discharge of cortical neurones might be a definition as well as a measure of the so-called epileptic tendency or convulsive threshold which determines those patients who will show a convulsive reaction to brain trauma or to abnormal states of cerebral nutrition.

SUMMARY.

The value of the electroencephalogram in the clinical treatment and understanding of epilepsy and epileptoid conditions has been discussed on the basis of over 400 examinations conducted on patients with various neurological and psychiatric disorders during the past two and one-half years. The E. E. G. was found valuable in the differential diagnosis of epileptic as opposed to other types of clinical "spells" but it was felt that the diagnosis of epilepsy should be made on the basis of a combination of E. E. G. and clinical criteria since epileptiform seizure waves are found in the E. E. G. of patients who are not subject to paroxysmal loss of consciousness or to convulsive movements. The localizing signs and the form of seizure waves in the E. E. G. should be important in questions of surgical intervention. The continuation of less severe epileptiform activity as revealed by the E. E. G. taken when there are no clinical signs of convulsive activity appears to bear some relation to the amount of personality disorder or deteriora-

tion in epileptic patients. The discovery of seizure waves in the E. E. G. from patients who had not hitherto been suspected of epilepsy makes possible a definite diagnosis of epileptoid disorders in patients not subject to overt paroxysmal attacks. The E. E. G. provides a sensitive indicator of the effects of anti-convulsive therapy. The relation of these findings to our conceptions of the neuro-physiological mechanism of epilepsy is discussed.

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DISCUSSION.

DR. WILLIAM G. LENNOX (Boston, Mass.).—I think this contribution of Dr. Jasper's is a valuable one. We need careful work of this sort with regard to the possibility of artefacts and errors that may creep in.

I was particularly interested in his finding abnormalities in children which would not ordinarily be clinically classed as epileptic. As I understand behavior children and temper tantrums, I wonder if he feels that these are potential epileptics, children who if followed over a period of years would later on develop epileptic seizures, or whether he regards this as another form of synchronization, or if we are allowed to keep our word of dysrhythmia, something we will say differing from paroxysmal tachycardia, such as auricular flutter or fibrillation.

The other point is a matter of instrumentation and the practicability of having some sort of apparatus like this in colonies and in clinics. I am afraid I was a bit glib in my mention of the fact, because I didn't point out that this is at present a highly technical problem and needs expensive and sharply supervised apparatus.

DR. JASPER.—We believe that in some cases the E. E. G. gives sufficient evidence for the diagnosis of potential epilepsy in cases who have never given any clinical basis for such a diagnosis. In one case formerly considered as a behavior problem due to poor environmental conditions we made the diagnosis

of potential epilepsy and within two weeks of our examination the patient had his first convulsion.

It does not seem to me that we are yet quite ready to abandon the word epilepsy even though the E. E. G. has shown us a great deal more than we formerly knew about its nature. We do not know enough yet about the real nature of the physiological changes responsible for the seizure waves. Dr. Lennox's term, "paroxysmal cerebral dysrhythmia," presents more than articulatory difficulties. Epilepsy may not be primarily either cerebral or a dysrhythmia. In fact one of the most striking characteristics of a series of seizure waves is their most regular rhythm. If by "dysrhythmia" is meant a change in frequency this does not differentiate between epilepsy and many other non-epileptic brain conditions, such as post-encephalitic conditions or brain tumor, or even normal sleep; conditions which show more true dysrhythmia in terms of irregular potential disturbances than does epilepsy. I should like to suggest the term *periodic hypersynchrony* as more truly descriptive of changes in brain function in epilepsy as opposed to other pathological conditions.

A CASE OF PROTRACTED HYPOGLYCEMIA.

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On account of the comparative rarity of protracted hypoglycemia as a complication in the treatment of schizophrenia by "insulin shock," the following case is reported.

Miss L. H., a school teacher, age 29, was admitted to hospital October 1, 1935, having previously been a patient in three mental hospitals during the preceding year. Her father has suffered from schizophrenia necessitating continuous confinement in mental hospitals since 1912. At present he presents a picture of typical schizophrenic deterioration. Prior to the onset of her illness she was extraverted and well adjusted. Mild mental symptoms, anxiety, restlessness and insomnia made their appearance in April, 1934, at a time when she was under the strain of examinations. Acute symptoms became manifest in October, 1934, when she became confused, noisy, apprehensive and resistive. The subsequent course of her illness was characterized by a period of stupor lasting two months, gradually increasing indifference, muscular rigidity, mutism, negativism and impulsiveness. When admitted to the insulin ward she was totally incapacitated and completely out of touch with her environment. She presented a typical picture of schizophrenia of the catatonic type.

Physically she was 25 pounds underweight and was suffering from a chronic cystitis which had been present for several years.

Treatment with insulin was commenced June 3, 1937, when she was given an intramuscular injection of 20 units, fasting, at 7.35 a. m. (The insulin was that prepared by the Connaught Laboratories of the University of Toronto, 80 units per c. c.) At 10 a. m. a definite change was noticed in her features. The obviously preoccupied appearance had vanished. Her expression was completely relaxed and the tension gone. After dinner she again resumed her strained features, rigidity and awkward postures.

The dose of insulin was increased eight units per day until the coma dose of 72 units was reached July 15, 1937. On this occasion

she remained in light, quiet coma 40 minutes and regained consciousness gradually over a period of 50 minutes after receiving 160 gm. sucrose by gavage.

On June 16 she was given 76 units of insulin at 7.35 a. m. and passed into a quiet, moist coma at 11.00 a. m. Shock was terminated at 12.10 p. m. by the intravenous administration of 25 gm. of glucose. She fully regained consciousness in three minutes' time.

On June 17 she received 80 units at 7.40 a. m. and passed into a dry coma at 10.00 a. m. At 11.45 she showed severe myoclonic twitchings involving the face, shoulders and arms. Shock was terminated at this time, in the same manner as the day previous with the same immediate response. She showed evidence of secondary shock that evening at 8.00 p. m. which was easily controlled.

On June 18, she received 76 units of insulin at 7.37 a. m. At 8.30 a. m. she was completely relaxed, somnolent and perspiring moderately. By 9.15 a. m. she had passed into light coma. The corneal reflex had disappeared, the deep reflexes were hyperactive and the plantar reflex gave a typical extension response with fanning. At 9.30 mild twitching was noticed in the muscles of the face. At 11.06 she was given 160 gm. of sucrose by gavage after having been in a quiet moist coma for about two hours. At 12.00 noon she was showing no signs of regaining consciousness and was given 1 c. c. of 1/1000 adrenalin solution intramuscularly and 25 gm. of glucose intravenously with no apparent results. At 12.30 her physical condition became alarming. Her color was ashen, her pulse rapid and weak and her respirations labored. The adrenalin was repeated at 12.40 p. m.; the intravenous glucose at 1.00, 2.00 and 4.00 p. m. and 70 gm. of sucrose were given at 1.30, 5.30, 7.00, 8.30, 10.30 p. m. and 8.00 a. m. As her condition remained critical an ampoule of coramine was administered at 1.20 p. m. and repeated at 5.15 p. m. with some improvement in her respirations. Seven and one-half grains of caffeine sodium benzoate was given at 4.35 p. m. and 6.40 p. m. Beginning at 9.00 p. m. she was given an ampoule of coramine and one of caffeine every two hours, something every hour for 12 hours. The coramine was continued every four hours for the following 12 hours. An ampoule of digifoline was given every four hours beginning at 10.00 a. m. June 19 till 2.00 p. m. June 20, then digitalis leaf grains 2 daily till the emergency had passed.

Throughout the afternoon of the 18th she was deeply unconscious and showed a complete absence of reflexes and loss of muscle tone. During the night she had several involuntary liquid stools. At 12.30 a. m. July 19, 1937, the deep reflexes were absent but the plantar reflex gave a flexion response. During the early morning she gradually became more restless but her movements were aimless and very ataxic. At 7.00 a. m. June 20 she opened her eyes for the first time, without recognizing anyone. Her first vocal response came at 10.30 a. m. on this date when she said " Oh " as a gavage tube was being passed. The deep reflexes were still absent with the plantar reflex giving a flexion response. Her ataxia was slowly improving. About noon on June 21 she appeared to recognize the objects in the room and her muscular co-ordination was good. Later in the afternoon she was able to change her position in bed without assistance. On June 22, 23 and 24 the biceps and triceps reflexes were equal and active but the patellar and ankle jerks were absent. On June 25 all the deep reflexes were equal and active.

The temperature chart is worth noting. During the period of coma, and confined entirely to it, she ran a fever of about 102, and at 8.00 p. m. on the first day it reached 103.8. The pulse during this period varied from 100 to 140 and the respiration rate between 24 and 34.

The blood pressure was maintained remarkably well, varying from 138/100 to 94/54. There appeared to be a gradually diminishing pulse pressure as coma progressed until at one point at 3.30 p. m. June 19 it was 4 m. m.

The blood sugar * curves covering this period are most interesting. The fasting blood sugar level on June 18 was 123. During the course of the first hour after the giving of insulin it dropped to 42, and an hour later to 36 where it remained until the giving of sugar. At 1.30 p. m. it had risen to 170 mgm., and at 2.30 p. m. to 210 mgm., and at 3.00 p. m. to 235 mgm. Still the clinical picture remained unchanged. At 7.00 p. m. the blood sugar was still 168. Then a small dose of insulin was given (16 units) which caused the blood sugar to drop quickly to 140 without apparent effect on

* The technique used for blood sugar determination was the Van Slyke and Miller modification of the Hagedorn-Jensen method.

the patient. Throughout the remainder of the period of coma her blood sugar level varied from 150 to 162.

The period of coma extended from 9.15 a. m. on June 18, 1937, to 10.30 a. m. June 20, 1937—a period of about 49 hours. Tube feedings were necessary till June 22. The return to consciousness marked the turning point in the course of her illness. Signs of improvement were noted immediately. Her facial expression remained relaxed and calm and she soon became cooperative to nursing care. By June 27 she was talking spontaneously and when her mother visited she was more friendly toward her than she had been in many months. She soon began feeding herself. By July 9 she was dressing herself, her gait was brisk and she attempted to play a game of tennis. She was sufficiently well to leave hospital September 23, 1937. When seen a month later she was enjoying the company of her old friends, assisting with the housework at home and showing her old interest in music. During the course of her treatment she gained 31 pounds, which brought her weight to about 10 pounds above her previously normal level.

After the period of protracted coma she was given five days of rest without insulin and then treatment was recommenced with 20 units, increasing the dose four units a day. The shock dose on the second occasion was found to be much smaller than in the first instance, namely 40 units. Treatments were continued for another 15 days and care was taken never to allow her to remain in coma longer than one hour at a time.

It is worthy of note that when the patient was just beginning to "find herself" about June 24, 1937, she had lost all sense of time. She stated the year was 1934 and that she was married. This is interesting because it harks back to the onset of her illness; the last interest she displayed was in an engagement. She apparently was left with a complete amnesia for the duration of her illness. Early in July she commenced to read the daily paper and was surprised at the news items she read because she was ignorant of events leading up to them. An improvement in affect was an early observation. She grew very friendly with, and even dependent on, the nursing staff, continually asking to have things explained to her and always eager to discuss her past life with them. During her convalescence she remained free of false sense perceptions with the exception of a few hours on August 14 when she said she heard

voices; and she had a fair degree of insight into her illness, realizing not only its nature but that her bizarre experiences were a result of it. Deep probing was purposely avoided because it was considered dangerous.

Comments.

Our patient is of the tall asthenic type with cold blue hands and feet. James and other observers have noted that this type shows an undue sensitivity to insulin.

It will be remembered that she was slow to respond to the administration of sucrose on the day of her first coma and required intravenous glucose for the interruption of her second and third periods of coma.

Moreover she passed into coma unduly early on the day of her protracted coma which should have been heeded as a warning.

She was left in coma two hours before any attempt was made to interrupt it. This no doubt was too long for this patient. Many patients however can be safely left in coma up to two and one-half hours.

Intravenous glucose was not administered until 54 minutes after the giving of sucrose by mouth. It is generally believed that if a patient does not show signs of regaining consciousness within 30 minutes after the giving of sugar by mouth, glucose should be given intravenously.

During the course of the protracted coma, the diarrhœa, tachycardia and pyrexia, I believe, might justly be looked upon as evidence of insulin toxicity.

The blood sugar curve is interesting. The clinical picture did not change in spite of the fact that the blood sugar level varied from 30 mgm. to 235 mgm. Hence there does not appear to be a direct relationship between the clinical picture and the blood sugar level. It might be suggested that the brain cells were so injured by the hypoglycemia that they were rendered incapable of utilizing the carbohydrates that were available and required the period of 49 hours to recover.

The gradual narrowing of the pulse pressure is hard to explain. This is just the opposite to what one usually finds in daily coma, when the tendency appears to be for the pulse pressure to increase, a response similar to the action of adrenalin.

Repeated spinal puncture was not used and might have been effective.

Vitamin B1 is now available in crystalline form (Merck & Co.) and appears to act as a catalyst in the metabolism of carbohydrate. Its effect in this case would have been most interesting.

Lastly and most satisfying was the favorable outcome. The improvement noted in the psychosis began with her recovery from protracted coma and has continued up to the time of writing when our patient is again able to enjoy all the pleasures she did prior to the onset of her illness.

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MENTAL DISEASE IN RUSSIA.*

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As part of a survey of the various aspects of mental disease in the United States and Europe, a personal attempt was made during a visit in Russia to obtain information and data concerning the organization of the psychiatric facilities for the detection and care of mental patients. In addition, some data were obtained concerning the prevalence of specific mental diseases, especially for manic-depressive insanity, in order to check the statement made by Williams [8] to the effect that with the elimination of the competitive capitalistic system manic-depressive insanity had become a rare disease in Russia. In the course of the investigation an inquiry was also made as to the effect of the present Soviet régime upon the increase and nature of mental disease.

Social conditions vary greatly in the various Republics of Russia. While it may be that similar psychiatric practices obtain in the various parts of Russia, the present information is based only upon data available for two of the most important republics, namely the Russian Soviet Republic and the Ukrainian Soviet Republic. Most of the data for the former were obtained through the courtesy of Dr. A. U. Rapaport at the Cramer Institute of Neuroprophylaxis in Moscow and Dr. L. Brussilowski of the University of Moscow. A recent comprehensive report of the Ukrainian Psychoneurological Academy edited by Rokhlin has furnished us with most of the data for the Ukrainian Republic.[6]

Organization.

The Russian Soviet Republic which contains approximately three-fourths of the population of the U. S. S. R. is divided into districts and in each district there is a medical office. Attached to this office are several psychiatrists, their number depending upon

* This study was conducted under the auspices of the Council for Research in the Social Sciences of Columbia University.

the size of the community. Each psychiatrist is responsible for the mental health and care of the individuals in his allotted section of the district. His rôle is that of a counselor. His duties are a combination of psychiatry and mental hygiene. From a more strictly psychiatric angle he is responsible for the hospitalization of the patients in his district and for their supervision in home care, either before or after hospitalization. From a mental hygiene point of view he advises his charges with respect to marriage, divorce and employment. He instructs families concerning the care that should be given to the milder patients at home or to patients discharged from mental hospitals. He has a certain amount of legal authority with factory managers, directing them to place mental cases in more congenial surroundings. He may also exercise a favorable influence in the community by legally restraining neighbors from annoying mental patients. In assisting in the economic rehabilitation of patients he may arrange for them to work in special factories for invalids where they would not be in competition with normal people, and consequently not subject to feelings of inadequacy and inferiority. In the event that the patient works best at home, arrangements to this effect are made. The family is often paid by the state for the care of an insane member. At many of the psychiatric dispenseries a workshop is maintained for occupational therapy.

Committment is a medical rather than a legal procedure. At the request of a relative of the patient or a neighbor, the district psychiatrist examines the patient and writes a certificate testifying as to his mental condition. Depending upon the nature of the illness and the available psychiatric facilities in the community, the psychiatrist may send the patient to a clinic, a sanitarium, a mental hospital, a neuro-psychiatric colony or he may recommend that the patient be cared for at home. In general, mild cases are sent to clinics, if one is available. Neurotic and psychoneurotic cases are generally sent to sanitariums which are semi-locked. Disturbed cases are sent to mental hospitals. Chronic and quiet cases are usually sent either to neuro-psychiatric colonies or to collective farms. In the latter instances at attempt is made to make the patient self-supporting. Chronic and mild cases may be cared for in their own homes but not in other private homes, since this would be regarded as capitalistic exploitation and hence non-Soviet in spirit.

All psychiatric treatment is free. In clinics it is possible to carry a patient without any certification as to his mental status, but all patients kept in locked mental hospitals have to be certified as insane by the district physician.

The feeble-minded are sent to the same hospitals as the psychotic but are kept generally in separate buildings. Some senile dements go to mental hospitals but usually they are kept in homes for invalids. Psychotic epileptics are kept with other psychopathic patients. Special working conditions are created for non-psychotic epileptics so that they will not injure themselves, but may be self-supporting. Chronic alcoholics are sent to neuro-psychiatric colonies, but acute cases frequently are sent to special institutions for alcoholism.

If the relatives of a patient object to his hospitalization they may appeal to the chief director at the medical office in their district who may, at his discretion, order an investigation. Complaints are rare since patients who are not dangerous to themselves or others and are not social problems are readily discharged to their families, provided that the family has facilities for their care. Whenever a patient is discharged from a mental hospital the district physician is informed of his discharge so that he may supervise the patient upon his return to the community.

Incidence.

Adequate and complete data with respect to incidence of mental disease are lacking, but available data would indicate that mental diseases are as prevalent in Russia as in any other country. For example, the district psychiatrists estimate that about one per cent of the population are under psychiatric care. This figure, being based upon the total mentally incapacitated in the community is somewhat higher than the more conservative census figures for the Scandanavian countries and for the hospitalized population in American institutions for the insane and feeble-minded. Thus 0.74 per cent of the total Swedish population [2] and 0.64 per cent of the Norwegian population [7] in 1930 were recorded as being feeble-minded or insane in their census reports. The 1935 report of the Commissioner of Mental Disease of Massachusetts, which state has the highest incidence of hospitalized cases in the United States, indicated that 0.67 per cent of the population were in state

or private institutions for the insane or mental defectives.[1] The addition of unrecorded mentally ill to the above figures for Sweden, Norway, and Massachusetts would bring them to about the same level as the Russian estimate.

Some further concept of the incidence of mental illness in Russia may be obtained from the fact that in the Russian Soviet Republic there are considerably more than 40,000 institutionalized patients. A recent census indicates that there are 35,000 patients in neuro-psychiatric colonies, and an additional 3000 on collective farms.

TABLE 1.

A COMPARISON OF THE RELATIVE PREVALENCE OF VARIOUS TYPES OF MENTAL DISEASE IN MENTAL INSTITUTIONS IN RUSSIA AND THE UNITED STATES.

	Per Cent of Total Resident Population.		
	United States.[4]	Russian Republics.	
		Russian.[5]	Ukraine.[6, p. 230]
Diagnosis.	1933	1935	1933
Dementia præcox	45	54	51
Manic depressive	12	2	5
Senile dementia	4	3	4
Cerebral arteriosclerosis	4	2	1
General paresis	5	4	4
Alcoholic psychosis	3	3	?
Mental deficiency	6	9	11
Epilepsy	3	12	12
Psychoneurosis	1	3	2
All others	17	8	10
Total	100	100	100

In Moscow alone there are an additional 2000 in mental hospitals.[5] This estimate does not take into consideration numerous mental hospitals in other cities of the Russian republic. In a survey of some cities of the Ukraine, a total of more than 6000 patients were found in 11 hospitals.[6, p. 251]

A relative comparison of the various types of mental patients present in United States and Russian mental institutions is shown in Table 1. Differences in diagnostic criteria and hospitalization, together with other crucial factors such as the relatively greater hospitalization of the feeble-minded and epileptics in mental hospitals in Russia than in the United States, where these cases are

usually admitted to special state schools or institutions, eliminate any possibility of truly valid comparisons, but a general comparison is possible. It is evident that in both countries about every other resident patient is suffering from dementia præcox. The proportion of feeble-minded and epileptic patients is higher for the Russian data. For senile dementia, general paresis and alcoholic psychoses the differences are not great. As is very apparent, the Russians as well as the Americans are susceptible to manic-depressive psychosis, though the proportion of manic-depressive patients is higher in the United States. It is however very doubtful that this difference is due to differences in the economic system. A more plausible explanation would be to attribute the discrepancies to differences in diagnosis and hospitalization.

Changes Due to the Soviet Régime.

According to Dr. Rapaport, the Soviet régime as compared with the pre-Soviet régime has resulted in a reduction of alcoholic psychoses, general paresis, manic-depressive psychosis, and psychoneuroses. There has been no decrease in dementia præcox.[5] This statement is a matter of clinical opinion rather than a statistical fact, since no long period trend data exist in Russia. No reliable records are available with respect to the incidence of mental disease during Czarist days, or during the early days of the revolution. It is only within the last five years than an attempt has been made to estimate the prevalence of mental disease.

One argument advanced by Russian psychiatrists to explain what they believe to be a reduction in mental disease, is that life today in Russia is more hygienic mentally. Since the state undertakes to secure employment for all, feelings of insecurity and worry about the future are eliminated. In addition, family tension is reduced by the simpilicity of divorce and the economic independence of the wife. Since most women in Russia do the same work as men, and earn the same salaries, they are to a much less extent, than women in other countries, dependent on their husbands for economic support. In those instances of incompatibility in which family life is the generator of continuous high tension, the matrimonial partners in Russia, unfettered by economic bonds, find it easier to divorce and thus eliminate the disturbing situation. It is probably

true that in other countries the ill-mated are forced to continue their maladjusted marriage for reasons of economic necessity. Also it is true that these unfortunate individuals would be happier if they could sever their uncomfortable marital bonds.

However, it has never been demonstrated that psychic tension will produce mental disease in a basically normal person, or that absence of tension will produce a healthy individual from a basically psychopathic individual. Dr. J. V. May [3] in discussing this aspect of mental diseases writes: "Financial reverses, domestic difficulties, the death of near relatives, the ordinary hardships and disappointments of life, even ill health, do not as a rule mean the development of a psychosis in the normal, properly balanced individual. In the constitutionally predisposed, the love affair, the loss of a position, the upsetting factor, whatever it may be, is merely the 'straw that breaks the camel's back' and is nothing more than an accident of fate, a pure coincidence."

There is, however, one respect in which mental disease in Russia today differs from Czarist Russia. Formerly religion was a powerful factor in the lives of the people and when an alcoholic patient suffered from hallucinations of a persecutory nature, he usually saw devils persuing him. Today the devils have been replaced by Stakonovites, or "good workers." The voice that torments the schizophrenic is no longer the voice of God accusing him of sin, but that of other workers who accuse the patient of not doing his share of the five-year plan. Patients with delusions of grandeur no longer imagine themselves as Czars or kings but as great engineers and inventors.

However, this is but a superficial change. The basic reactions of delusions, persecution and hallucinations remain unchanged. Only the coloring in changed. This, of course, is to be expected since the symptoms expressed are as much a product of the culture as the language used to express them.

SUMMARY.

Psychiatric work in Russia today is organized somewhat along the lines of public health work in this country. In each community there is a district psychiatrist who is responsible for the mental health of his district.

The most marked point of difference between psychiatry in Russia and in other countries is that a greater attempt is made, by an adjustment of working conditions, to adapt the environment to the patient.

With respect to the types of mental disease and the basic psychopathic manifestations, there do not appear to exist any differences between Russia and other countries. The Soviet régime has brought about a change in the content of mental symptoms, but there is no evidence that it has either decreased the incidence of mental disease or altered the basic forms of mental disease.

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HOSPITAL RECORDS.*

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The writer has been requested by the Program Committee to write something on this important topic, hence this paper. We will not discuss all the many records which mental hospitals must keep, either according to law or custom, but will confine our remarks to medical records in particular.

In New York State we have a Committee on Statistics and Forms appointed by the Commissioner of Mental Hygiene. This committee consists of eight members: The Director of the New York State Psychiatric Institute and Hospital, Director of Mental Hygiene Statistics, four superintendents and two stewards. The committee concerns itself with statistics and the development of standard forms for use in the several hospitals in the Department of Mental Hygiene. Approval of the Quarterly Conference of the Commissioner, Boards of Visitors and Superintendents is necessary before new forms are adopted for general use. The Department of Mental Hygiene has located in its Albany office the central department of statistics under the able direction of Dr. Horatio M. Pollock, to whom all the hospitals forward the various hospital statistics required by his division.

Records are of value only in proportion to the interest and care in which they are made and collected. To collect accurate hospital records some uniform plan of doing so is essential. In order to promote statistical uniformity the Committee on Statistics and Forms of the New York State Department of Mental Hygiene has published a " Statistical Guide " for the use of the hospitals in the Department. Private licensed institutions and the hospitals for the criminal insane also use this guide, and forward their statistics to the Albany office of the Department. I am under the impression that the Massachusetts Department of Mental Hygiene follows some such procedure. This may also be true of other states.

* Read at the ninety-second annual meeting of The American Psychiatric Association, St. Louis, Mo., May 4-8, 1936.

For the collection of accurate hospital records the following requirements would seem necessary:

A. Members of the medical and other elements of the hospital personnel who are genuinely interested in the collection of accurate data.
B. Suitable standard forms on which such data are to be entered.
C. Sufficient stenographic help to enter in the case history of the patient the details of the mental and physical examination, anamnesis, continued notes, treatment data, etc.
D. A statistical clerk whose duty is to take charge of all records not kept on the various ward services.
E. A central department of statistics located in the central administrative offices of the department in charge of a trained statistician, assisted by a sufficient number of assistant statisticians, stenographers and clerks. This unit should be equipped with modern tabulation machines.
F. Proper regulations for receiving and entering any hospital data and sending such information, when indicated, to the central bureau.

This plan tends toward uniformity and accuracy in the preparation of statistics.

With respect to the case record of the patient: The medical officer who receives the patient should make a note of the patient's general behavior and mental condition on his entrance to the hospital. It is important to make as complete a physical examination on the day of admission as possible in order to detect any injuries or to institute immediate treatment in the case of acute physical conditions. The X-ray department should always be called in to take X-ray exposures in case of any suspected or obvious fractures, any cases of suspected tuberculosis or for any other good reason.

A patient having a contagious or infectious disease should be isolated at once and the usual sanitary precautions taken.

In New York State all the hospitals follow the "Guide for Mental and Physical Examination" originally devised by Dr. Adolf Meyer and revised in turn by Dr. George H. Kirby and Dr. Clarence O. Cheney, in making mental and physical examinations and in taking anamneses. The results of any laboratory tests and special examinations at the diagnostic clinic should be filed in the patient's case history.

The physician to whom the case is assigned should make a full note on the mental condition of the patient on the day of admission.

If some days are allowed to elapse the entire mental picture may change and an early opportunity of noting acute symptoms may be lost. Moreover, certain patients are more willing to talk freely on admission. Experience has taught us that a number become uncommunicative when they find themselves in a mental hospital. If a complete mental examination cannot be made on admission, the reason should be stated in the clinical history. The patient's progress should then be carefully watched and a complete mental examination done as soon as the patient becomes more accessible. The same rule should hold in those cases where a complete physical examination is impossible on admission. The New York State Mental Hygiene Law provides that entries with respect to the patient's state must be made within three days following admission.

When the patient is visited by relatives or friends an anamnesis covering the family, personal histories and the onset of mental and physical symptoms should be secured from them. If he has previously been in a mental or general hospital or in a correctional institution, a letter should be addressed to such institution asking for the patient's record. If not visited within a few days, a letter should be written to the relatives or friends to call at the hospital at their earliest convenience to give the desired information. If there is no response a social worker should be sent to the home to secure the necessary data.

Continued notes should be made in the patient's case history after the regular mental and physical examinations have been completed. The frequency of such notations will depend on the mental and physical condition of the patient. If there are daily variations, these should be noted daily. As a rule, we insist that all new cases be noted at least twice a week for the first month. A great deal of information about the patient can be learned from a perusal of the nurses' notes and from conversations with the nurses and attendants with respect to his behavior, talk, activities, habits, eating, sleep, etc., inasmuch as the ward force is in continuous daily contact with the patient and can often contribute valuable information for the case record. My observation is that what the ward force sees and thinks about the patient is not often taken enough advantage of by our physicians.

Finally, after all the data concerning the patient has been secured, the case history should be summarized and the patient presented

at staff meeting or disposed of in a conference between the Clinical Director, the ward physician, who has written up the case, and the physician in charge of the reception service. If the patient is of the more recoverable type he is allowed to remain on the reception service. If not, he is transferred to some other division of the hospital.

A copy of one of the four types of commitment papers is an essential part of the case history. Likewise, the statistical data sheet, which is filled out by the physician writing up the case, the information being secured from the patient, if competent to give it, if not, from the relatives.

The question as to how much information regarding therapy should be embodied in the case history is of interest. My impression is that not much thought is given to this and we have too little of it. The nurses' notes, of course, record what drug therapy has been prescribed and administered, the T. P. R., amount of sleep, food taken and the like. We know very little about the relative value of our therapeutic efforts along psychotherapy, occupational, amusements, physio- and hydrotherapy, medical and surgical lines or the influence of the ward force or with respect to the separation of the patient from the environment in which his troubles began. In other words, we do not have at hand a body of concrete information as to why a patient improves, so that we can utilize such information for the benefit of other patients. Nor do we have as much data as we should from the patient as to what he think helped him get well or improve. These are important points. It may be that if our case histories related in more detail just what had been done for a particular patient along various therapeutic lines, we might, in time, have a sufficient body of data which would repay analyses and give us important therapeutic leads. At any rate, it would be well worth trying. In order to do this extensively, it is essential that the hospital provide a sufficient stenographic force for the purpose. Ward physicians would, of course, have to give careful study to the effects of the various therapeutic measures instituted and not note them down merely as a chore to be gotten through with as rapidly as possible. Negative as well as positive effects of treatment should be noted.

As to continued notes on patients who are on the medical, surgical, infirmary and continued treatment wards, here again

sufficient stenographic help is essential if the notes are to be kept up to date. Many of the continued treatment services contain large numbers of patients and the physician in charge is often so occupied with routine work that, unless he has adequate stenographic and medical assistance, it is impossible for him to adequately note the changing condition of patients.

When a patient is discharged, the case history should be sent to the office of the record clerk, where it should be properly indexed and filed.

The Clinical Director should be charged with the task of seeing that the general medical work of the hospital is kept up to the highest standard and should encourage the hospital physicians to engage in various avenues of research. He should make frequent visits to the various ward services, examine the case histories in order to ascertain if they are in proper order and that adequate medical and psychiatric care is being carried out. He should record his inspections in a written report to the Superintendent and be free to make any suggestions for improving the general care and treatment of patients. If the ward notes are falling behind, the reason should be sought and, if necessary, an additional stenographer from one of the other units be sent to assist the ward physician.

The general interest of the medical staff in its manifold duties can be augmented by the Superintendent arranging for a course for new physicians in pathology, psychiatry, social service and general administration. Such a course has been in vogue at the Binghamton State Hospital for eleven years and is designed to give physicians a better conception of the workings of a mental hospital as a whole. Very few graduates in medicine have had any business training. Psychiatry in mental hospitals has its business as well as its scientific side. This fact is often overlooked by many of our physicians, but we can hardly blame them for this oversight unless we do something to train them in the business, as well as in the practice of psychiatry. In order to keep the medical, social service, nursing and occupational staff up to date in their several specialties, we have a monthly seminar at which reviews of recent literature are presented by the various groups. So that the staff may keep in touch with what is going on in the clinical laboratory, the pathologist holds pathological conferences twice a month. We have also a

Psychiatric Society, composed of members of the medical staff and a number of physicians practicing in the City of Binghamton, which meets once a month. A section of each program is devoted to the presentation of cases of interest to the general practitioner. In addition, a number of our physicians are listed for talks on the various phases of mental hygiene, sponsored by the Broome County Mental Hygiene Society. Administrative conferences are held twice a month by the Superintendent which are attended by the various departmental heads. He also brings to the attention of the medical staff any important matters of administration at either of the two weekly clinical conferences.

In conclusion, the writer is of the opinion that the more rounded out training our hospital physician receives, the wider will be his grasp of the care and treatment of mental patients as a whole and the more discriminating he will be in recording the essential facts regarding patients. Only the more important data should be incorporated in cases history records; trivialities should be eliminated.

DISCUSSION.

DR. CLARENCE O. CHENEY (New York, N. Y.).—I have thought for some time that perhaps because of our organization of a systematic record-making that the physician unfortunately for the patient, may get the idea that the record is an end in itself and that making a record completes his observation of a patient and that the record assumes undue importance compared with the actual treatment of the patient. I have hesitated to say much about it, because for many years, beginning with Dr. Meyer's work in New York State, there has been an effort to record facts regarding patients because it was recognized that unless the facts were recorded, knowledge could not be massed for further study of records and getting of information from past experience for application to future experience.

There is and has been and will continue to be the need, of course, for making records, but unless the record is used for the benefit of the patient or for subsequent patients or for subsequent treatment by other physicians, the record does not make any difference to the patient himself or herself. I have felt that if physicians could feel that instead of having the main end job of making a record that they would get to know their patients, that the main aim would be to know their patients, to discuss things with them, to sit down and talk to them in quite an informal, friendly way without the idea in the physician's mind that he must make a record of anything that is done, that the patients might benefit by such an attitude on the part of the physicians.

DR. ADOLF MEYER (Baltimore, Md.).—Mr. Chairman, I am keenly interested in the question of how the record can be made useful in the work with the patient, in the work among physicians and finally in deriving data for generalization. When I first started, I was dealing with groups of assistants who were trained for certain items, but who had as yet relatively little training in the comprehensive putting together of the data for the meaning to the patient and for the meaning to the fellow physicians and ultimately for the meaning of general concepts. There was a certain possibility of catching the facts even if the physician did not put himself to the task of getting a full grasp on the case. That, fortunately, is beginning to change.

I think the majority of medical students begin to get a sense of wanting to know more themselves rather than just grinding out a statement which then somebody else might use for generalizations or for specific data and things like that. Our records ought to get smaller from one point of view and ought to contain that which Dr. Cheney emphasizes, that which is of value for the management of the case, and especially where several physicians have to work and exchange so that the patient does not suffer unnecessarily from the ignorance where division of work makes necessary the coming in of other people.

We may be going to some extremes at the Phipps Clinic inasmuch as I ask the physician to put down a statement of the case as he sees it for the work of the clinic, a statement as he sees it for his communication with the nurses and the working together with the nurses, a statement that will express the case as the home physician and family physician needs it, and then a statement of the case as it is used in contact with the patient. We know that those are different. You have to be ready to give the facts in different groupings and assortments to those different people and to oblige the staff to do that is, of course, something which can only be done when you have a supernumerary staff. But if we make sure that the physician starts as early as possible to be interested in the case for the problems and then singles out what any particular case is interesting for and needs attention and emphasis for, then we shall probably also become a little bit critical of those statistics that are being ground out.

I have lately gone over an article on statistics which shows a tremendous amount of work back of it and awfully few answers to the questions that I should like to ask. I, therefore, should suggest that for the benefit of the statistical department the cases should have final summary concerning what the physician himself thinks that case is worth, in the way of teaching for the future, the grouping together of facts and the grouping together of problems. I think that is a way in which we shall help the statistical department just as much as by making sure that pigeon-holes shall be filled in in fragments, because fragments by themselves are a step but we have to think a little more in wholes, not always the whole of the administration or the whole of the patient, but there are many grades of wholes, groups of facts where single facts begin to get significance and to cultivate that, to see that

there is more and more of an idea that at the end of a case record there shall be an emphasis on what the case is worth remembering for, what the case throws any real light on, and then grouping together those suggestions from time to time and handing them out to the statistical department. I think that will do a tremendous amount of good to the patient, directness and economy of work, directness and economy of recording and progress.

DR. LESLIE B. HOHMAN (Baltimore, Md.).—May I say one word in defence of the records? I was trained in the Meyerian method of careful record taking and trying to see each case as a whole. Seeing each case as a whole means that the entire field in which human life may go asunder is taken into account. I should like briefly to record two cases which seemed to me to illustrate excellently how important it is to go on seeing the case as a whole.

Two men, both of whom break down suddenly in typical classical depressive reactions, both after having lost a major part of their fortune, both men feeling certain that the loss of the fortune or the temporary loss of fortune was not the major cause of their breakdown, both men with only moderately satisfactory marriages, both men with some tendency to extramarital flirtations and both men essentially Puritan in disposition. Both men after a year and a half recovered from the depression, but in the survey of the case as a whole with careful record-taking, the notation of their puritanical character and their tendency to attempt to avoid their somewhat unsatisfactory marriages was noted.

I group these together because they both stand together. Both of those men within a five-year period after the recovery from their original depressions again started on a depressive development.

Now having gotten complete records of those cases and knowing their whole life story, again no financial distress recurring, it was possible to put one's finger upon what was the probable source of the beginning of recurrent depression.

What seems to me to be the most hopeful thing in our study and in this very careful study of total psychotic reactions and total life histories was that with the stopping of the attempt to step out of the marriage situation and again violating their own puritanical standards, by stopping it in both cases, I have been able, or it seemed to me that I was able to abort for both of those men prolonged depressive attacks, that is, each of them terminating within a week or two weeks of the time that the extramarital difficulties were starting. That seems to me to be adequate excuse for going on studying in great detail the life histories of all of our patients and making adequate record studies. It doesn't seem to me to make much difference whether it gets down on paper or not, but the fact that one does study over the long period and sees the patient over the long range does make a great deal of difference for the future course of either their happiness or future psychotic development.

DR. ADOLF MEYER (Baltimore, Md.).—There is one thing that I would like to mention in this connection. I have of late been much disturbed and also interested and prompted in the direction of some action with regard to the seriousness of records and the need of protection of records. As soon as we begin to put things down not only in terms of nature and the acidity of the stomach and a few things of that sort and one figure or another, as soon as we take down the things that really cut the figure in the case, we put ourselves under a very serious obligation. We have in our records occasionally the necessity of expurgating the really important things which are alone a burden of statistical treatment, simply because we may find that we have not at the present time the machinery to protect the records.

I should like very much to have for a future discussion in the question of records attention paid to that issue. I have been trying to interest the great foundations or research councils in this question of how it would be possible to make the study of man practicable. At present we have to leave out of the study of man a good many of the vital things simply because we cannot trust the people who can get in and fuss with the records.

DR. CLARENCE O. CHENEY (New York, N. Y.).—Dr. Hohman's comment I am afraid, perhaps unnecessarily so, raises that issue that I mentioned when I said that I had hesitated to say much about what I had felt for some time regarding the making of records for fear that I would be understood to mean that it was not necessary to make records. That is not my idea, of course. The only thought that I have is not to have the record an end in itself and made in a perfunctory, mechanical way, but to have the record, as Dr. Meyer says, record facts that will be helpful to the patient or to somebody else. Far be it from me to think for a minute that records should not be made, because if there is anything that has bothered me over a good many years or some years at least, it is the unsatisfactoriness of records when one wishes to use them for research or study by others than those who have made them. The difficulty is always to make a record that can be used by somebody else, because things are left out or things that seem to be unessential are put in.

It has seemed at times that the question whether records could be used for research by others than those who made them could not be answered, because the viewpoint of the research worker has to start, as it were, with the making of the record. Records are made with certain viewpoints in mind. The viewpoint of a man who makes the usual record may be entirely different from a research worker's who comes along later and wishes to investigate a certain aspect. So we have pretty nearly concluded that for research the records must be made by the persons who are doing the research.

MISUNDERSTANDING OF THE PATHOGENESIS OF SCHIZOPHRENIA, ARISING FROM THE CONCEPT OF "SPLITTING."*

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The modern concept of schizophrenia has been greatly influenced by Bleuler, whose researches on the "basic" symptoms of this disorder are of epochal significance. But while his work brilliantly illuminates the clinical and psychological aspects of schizophrenia, it has led to a grave misunderstanding of its pathogenesis. This misunderstanding arises from the concept of "splitting," a concept which, despite a possible figurative value, is, when taken literally, misleading in the hypothesis it suggests regarding the underlying neural changes in this disorder.

The concept of splitting, as employed by Bleuler, finds its chief application in the association disturbances of schizophrenia. Ideas are associated in illogical and incoherent fashion; hence Bleuler speaks of splitting ("Spaltung") of the associations. He also uses the word "Lockerung," or loosening (as the loosening of earth with a plow). His views are summed up in the following paragraph on page 296 of his monograph:[2]

> Splitting is the prerequisite of most of the more complicated phenomena of the disorder; it places its characteristic stamp on the entire symptomatology. At the basis of this systematic splitting we have found a primary loosening of the association-systems. . . . . With the term schizophrenia I would designate both forms of splitting, which in their effects often fuse into one.

In considering the physical basis of schizophrenia physicians influenced by Bleuler's work are apt to hypothesize a figurative splitting of cerebral tissue. Owing to some disease or injury, cerebral tissue is thrown out of function, dividing the pathways which form the substrate of the mind. The substrate of the mind consequently no longer functions as a cohesive unit; its parts act inde-

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pendently of each other, giving rise to disharmony and confusion. In fairness to Bleuler it must be said that he himself did not draw such an inference; he felt that the assumption of a physical basis of schizophrenia is "not absolutely necessary" (p. 373). But if (as I do) one rejects the distinction between organic and functional and believes that all mental processes have a physical substrate, then, under the influence of the concept of splitting, one is bound to arrive at a hypothesis of the physical basis of schizophrenia similar to the one mentioned.

In this paper I shall give reasons for rejecting the concept of splitting. The association disturbances described by Bleuler necessitate a different interpretation; indeed, far from being characterized by splitting, they possess a quality that is *the very opposite of splitting.*

THE ASSOCIATION DISTURBANCES OF SCHIZOPHRENIA AND THEIR PATHOGENESIS.

The thinking difficulty of schizophrenia manifests itself in many spheres, one of which is the sphere of *symbolic thought.* The patient cannot distinguish adequately between a symbol and the object it symbolizes. For example, a middle-aged schizophrenic woman, speaking of the actor Warner Oland whom she admired, said, "He was smiling at me." Questioned about this, she said that, looking at the back cover of a moving picture magazine held a few feet away by a fellow-patient, she had seen a picture of the smiling Mr. Oland looking directly at her. Thus she had confused a picture of Mr. Oland with the man himself.

This confusion of symbol and object is seen also in young children—a fact of more than passing interest, since the similarities of schizophrenic and infantile mentation offer a clue to the mechanism of the former. The following illustrations were furnished by a child of average intelligence. At 24 months the child began, while looking at pictures, to try to seize the pictured objects as if they were real. At 25 months, looking at the picture of a car, he tried to lift the car from the picture and asked his father, "Daddy, get car out." At 27 months, drinking milk while looking at the picture of a horse, he said, "Give milk to the horsie," and spilled the milk on the image. At 28 months he began to be able to distinguish

symbol and object; looking at the picture of an aeroplane, he made no effort to pick up the pictured object, and said, "David can't get the plane out"; he said this in no tone of complaint but of declaration, as if to tell himself that what he saw was only the *picture* of an aeroplane. Nevertheless, the differentiation was not yet perfect; as late as 32 months, looking at the picture of a children's slide, which showed several children climbing up and one sliding down, he said, "Look! When I get in the picture, I (will) go up those steps and go down the slide."

I now submit that the term splitting is more properly applied to the person who *can* differentiate symbol and object rather than to him who cannot. The child starts out with a primitive concept of an object—an undifferentiated concept which includes both object and symbol, making no distinction between them. When he grows older, this primitive general concept is broken up, as if by a process of fission, into two narrower and more specific concepts, one for the object and the other for its symbol; he now can appreciate the difference between the object and a symbol which looks like it but isn't it; *here* is where one may properly speak of splitting. When schizophrenia supervenes, the two concepts tend once more to become fused; here it would seem proper to say there is not too much, but too little, splitting.

The foregoing argument applies to many other manifestations of the schizophrenic thinking disturbance. Thus it applies to the characteristic *inability to distinguish abstract and concrete concepts,* examples of which were given in an earlier paper.[6]

It applies also to the characteristic *inability to distinguish reality and fancy.* This is particularly cited because it is so often set forth as one of the results of splitting. Bleuler, for example, said (p. 287, first footnote): "Among schizophrenics the distinction between reality and fancy is . . . ., in consequence of the splitting of the psyche, diminished and often abolished." But this is an illogical use of the concept of splitting. One ought to speak of splitting, not in the case of the schizophrenic, in whose mind reality and fancy are fused, but in the case of the healthy man, who sharply differentiates them. The healthy man knows that "I fancy myself a millionaire" is not the same as "I *am* a millionaire"; he sharply separates these two ideas; it is he who may be said to show splitting.

The schizophrenic's difficulty in this matter is that he cannot split; his concepts of reality and fancy are hopelessly intermingled.

Irrelevant thinking is perhaps the most frequent manifestation of the schizophrenic association disturbance, and is important for this discussion. The patient's ideas are unduly influenced by associations which are irrelevant, or only pseudo-relevant, to his train of thought. Thus a patient who had been brought to the hospital by a Miss Brown thought she was in the "colored ward" of the hospital; when asked why she thought so, she said, "Because I was brought here by Miss Brown." Bleuler (p. 291) mentioned a patient who broke a window; when asked why, he said "because" the physician wears glasses.

The prominence of irrelevancies in schizophrenia shows how important a rôle is played in normal thinking by the capacity to differentiate concepts. In the pursuit of even the simplest and most automatic train of thought, irrelevant associations inevitably crop up in one's mind sooner or later. The normal adult possesses in relatively high degree the capacity to differentiate those concepts which are relevant and essential to his train of thought from those which are not. The schizophrenic, lacking this capacity, permits indiscriminate expression to irrelevant and relevant.

In this aspect of the schizophrenic thinking disturbance, as in those previously mentioned, it is helpful to consider certain similarities to infantile mentation. Infantile concepts have no sharp outline: they are nebulous and are the result of amusing mixtures of relevant and irrelevant. Thus a bright boy, age six, when told that twins could be of opposite sexes, asked in surprise, "Then how could they wear the same clothes?" He evidently had seen and been impressed by a pair of identical twins dressed alike, and his concept of twins included the irrelevant detail, identity of raiment. Another example shows how associations of the most ephemeral nature are permitted to enter into a concept when the child is too young to appreciate their non-essentiality. A child of 2 knew the word "wheel," as applied, for example, to the wheel of a toy car. One day, at 25 months, as he sat on the toilet, the white rubber guard (supplied with little boys' toilet seats to deflect the urine) came loose and fell into the toilet bowl; pointing to it, he exclaimed, "Broke, wheel!" In explanation it is to be noted that he had many toy cars whose wheels, when of rubber,

were always of white rubber. Thus he came to think that the word "wheel" embraced not only wheels but also anything made of white rubber.

In view of these similarities between infantile and schizophrenic mentation, I think that few tasks would repay the psychiatrist as much as the study of the infantile mind, particularly in the sphere of concept-formation. One is apt to suppose wrongly that the growth of the child's mind is by accretion and synthesis, *i. e.*, that his mind develops through the continual addition of bits of information to his present store of knowledge and through the synthesis of simple into complex ideas. This is just as wrong as the supposition that the child learns to read by learning first the letters of the alphabet and then combining them into words. While it is in a measure true of older children that they develop in the ways mentioned, in very young children the process of mental growth is quite of the opposite nature: it is a process of *analysis* rather than synthesis. Just as the child, in learning to read, first learns to recognize words and only later their component letters, so in general his earliest ideas are diffuse, undifferentiated concepts which in the course of time, by differentiation and analysis, become increasingly specific. This is illustrated by several of the foregoing examples, to which three more are added.

A child of two looked out the window one winter morning and, seeing an expanse of fresh snow, exclaimed, "Look! Sugar!" This illustrates the diffuseness of the child's earliest concepts. If a child's experience of white granular substances has been limited to granulated sugar, he is going to suppose that *all* such substances are sweet and are called sugar. As he grows older and wiser, this concept is analyzed, or "split," into many narrower concepts. He learns that there are great differences among such substances; one variety is not sweet but salty (salt); another, which falls from the sky, is cold and melts when taken into the hand (snow), etc.

A child of 20 months was playing with a ball which rolled away from her; she beckoned to it, held out her arms, and said coaxingly, "*Here,* ball." From her experience with people, who respond to coaxing, she had assumed that *all* objects may be coaxed. She had not yet learned to differentiate this proposition into its components: "People and certain other animate creatures may be coaxed, but not inanimate objects."

The same child, at 16 months, tried to drag a chair from the corner of the dining-room to the table, which was on a thick rug. She dragged the chair several feet, until it came to the edge of the rug, after which it would go no further, the edge of the thick rug acting as an obstacle. After some puzzled reflection she dragged the chair back to the corner and then started to drag it to the table all over again. This shows the faulty analysis of the child. The act of dragging the chair from the corner to the table was, in this child's mind, an *indivisible* concept; when the first attempt met with failure, she decided that the act as a whole must be tried over. An older child, with greater powers of analysis, would analyze the act into its parts, and would understand that only the faulty part need be repeated.

The foregoing examples, and many more that could be given, show that the schizophrenic thinks like a child; the evolution of his thinking apparatus has been reversed by dissolution. One therefore may understand the pathogenesis of his thinking disturbance by formulating, and reversing, the evolution of the child's mind. This evolution, as I have tried to show, is from the undifferentiated to the differentiated, from the diffuse to the specific, from the general to the special. The child's concepts are few and are of the most general nature. By a process of differentiation, his concepts become increasingly numerous and increasingly specific. What does this mean in terms of cerebral function?

During each mental experience there is activation of the highest cerebral centers. For each concept there is a particular pattern of centers activated. Thus, when I think of a tree, the pattern is not the same as when I think of a brick; and when I think of an apple tree, it is not the same as when I think of a pine tree. Two patterns may overlap, but no two entirely coincide.

The millions of cells in the highest cerebral centers, then, have the capacity to enter into a countless number of different combinations. Not only the number but also the "complexity" of these combinations must be considered. The complexity of a concept is matched by that of its substrate. When I think of the proposition that 2 and 2 make 4, the substrate activated is not as complex as when I think of a proposition of the calculus. *The difference between the child and the adult is that the child's cerebral cells can enter into only a few combinations, which moreover are least*

complex in type. His cerebrum, so to speak, lacks the "versatility" of the adult's. In schizophrenia this "versatility" is reduced from adult degree to some lower degree.

A crude analogy may be helpful. Suppose a community of 50 men is organized into a great many different clubs, with much overlapping, so that each club contains nearly all the men. On Mondays they meet as a golf club, and on Tuesdays as a fishing club. On Wednesday evenings they practice together as an amateur orchestra. On Thursday evenings they gather to discuss literature, and on Friday evenings science and mathematics. So long as the men are healthy and keenly alive, all these clubs will flourish. But suppose the community begins to deteriorate—perhaps hookworm infests the community, robbing most of the members of their energy and vitality. One of the results will be that the men will no longer enter so readily into their various "combinations." They will lose interest in their activities, and their clubs will languish. Moreover, the most complex activities will suffer the most; the mathematics club will be the first to deteriorate, the fishing club the last.

On this basis it is possible to explain the principal manifestations of the schizophrenic association disturbance. Thus where a normal man has two concepts, one for an object and another for its symbol, the schizophrenic has just one concept, standing for both object and symbol. Where a normal man has many ideas, the schizophrenic has few (poverty of ideas). Where a normal man's concepts are sharply differentiated and complex in character, the schizophrenic's are diffuse and undifferentiated and are lacking in complexity.

Mass Reflexes.

One of the characteristics of the immature organism is that its reactions tend to be diffuse, involving large portions of the nervous system in a single response. For example, Coghill [3] has shown that the earliest movements of *amblystoma* are of large segments of the body, and that as the organism matures movements appear which involve smaller and smaller segments. This is also true of man. The infant's movements are more diffuse than the adult's. The marvellously fine and precise finger movements of the violinist's left hand characterize the mature, rather than the immature, nervous system.

Disease, which reduces the nervous system from a higher to a lower level of evolution, causes a return to the primitive tendency to diffuseness of reaction. Thus in the stage of recovery of reflex function after complete division of the spinal cord, stimulation of any part of the lower limbs is followed by a diffuse response consisting, in part, of flexor movements of the lower trunk and lower limbs. This diffuse response of lower levels of the nervous system, released from the control of higher levels, has been called a "mass reflex." The concept implied in this term is important for psychiatry, since mass reflexes occur also in the highest centers. In other words, when the highest centers are incompletely evolved, or when they have been reduced by disease to a lower level of evolution, there is an increased tendency to mass reflexes. In an earlier paper,[7] in a section entitled "Mass Reflexes in the Highest Centers," I gave several illustrations of this proposition. Since the present paper deals with schizophrenic thinking disturbances, it is pertinent to mention that *hallucinations* constituted one of these illustrations.

The pathogenesis of hallucinations was discussed in a recent paper,[8] and a brief statement here will suffice. When I *see* a brick, I have (in Hughlings Jackson's terminology) a "vivid image"; concomitantly, there is activation of what may be termed the substrate of the vivid image "brick." When, on the other hand, I merely *think* of a brick, I have a "faint image," and there is activation of the substrate of the faint image "brick." The substrate of a vivid image includes, and is larger than, that of the corresponding faint image (this proposition is presented more fully in the paper cited). There is clinical evidence to show that the psychotic man's hallucinations—vivid images—correspond to the *faint* images he would have if he were sane under conditions otherwise the same. Thus one of the examples in the paper just cited (Observation 4) concerned a schizophrenic who saw, by hallucination, clouds of smoke in a situation in which, had he been healthy, he would merely have *thought* of clouds of smoke. Thus the substrate of a vivid image (an extensive substrate) was activated by a stimulus which, in a healthy person, would activate only the substrate of a faint image (a substrate not so extensive); this therefore is an example of a mass reflex.

One may conclude that an affection which robs cerebral cells of their "versatility," thereby reducing the number and the complexity of the combinations into which they can enter, also robs them of their capacity for entering into *small* combinations, thereby predisposing to the occurrence of mass reactions. The significance of this matter for the problem of splitting will presently become apparent.

"Splitting of Attention."

Enke[4] and others have investigated the ability of normal persons to attend to two or more matters simultaneously. The subject is given two or more tasks to execute simultaneously, and the manner of his performance and the number of his errors are noted. These tests are said to measure one's ability to divide or "split" his attention. Significant correlations have been found with physical and psychological types: schizothymic persons excel cyclothymic persons in their "capacity to split."

In discussing this matter, Enke said:

> The superiority of schizothymic over cyclothymic persons in their capacity to split their attention . . . . is obviously based primarily on the greater capacity for . . . . psychic splitting which is characteristic of the schizothymes. [His investigations show that] schizothymes have greater ability to split . . . . than cyclothymes. As a result of this capacity, they succeed better than cyclothymes in distributing their attention to different simultaneous tasks.

Thus Enke plainly implies that his findings accord with the hypothesis of splitting in schizophrenia, since they reveal, in schizothymes, the increased "capacity to split" which in even greater measure is allegedly so characteristic of schizophrenics. He assumes that the so-called splitting of schizophrenia is of the same cloth as the "capacity to split." But this is a great mistake. The so-called splitting of schizophrenia is a sign of disease, while the "capacity to split" studied by Enke is a sign of health; it is a measure of cerebral evolution rather than dissolution. It stands to reason that a person who can do two things at a time is, everything else being equal, superior to one who cannot. Several illustrations show this.

Luria,[9] in a series of ingenious experiments, showed that during the momentary "disorganization" which ensues when a mental complex is aroused, there is demonstrable loss of the ability to carry out certain simultaneous motor performances.

Pavlov noticed in his old age that he gradually lost the power to perform two tasks simultaneously. He said:[10] "It is a common occurrence that, being predominantly preoccupied with some one activity, we can simultaneously perform some other activity which has long been practised." After remarking that he had been "observing the diminution in the reactivity of my own brain through my advancing age," he said, "With time I progressively lose the faculty, when busy with one activity, of performing correctly another also."

In the case of a woman of 70, with early senile dementia, the relatives said that normally she did her housework with great efficiency; speaking figuratively, they said that in the kitchen "she could do ten things at a time." As her illness progressed she lost this faculty, "and now, if she's only doing *two* things, she can't keep track of which is which."

Ackerly,[1] observing a patient after frontal lobe extirpation, remarked on her apparent inability to divide her attention. "She was extremely slow and deliberate on all of her performance tests and this slowness was accompanied by strong concentration on one item at a time. She would never take in a form board as a whole, but would limit her attention to one part until it was finished, and then, and only then, would she work on or pay attention to any other part." He concluded: "If I see anything of fundamental significance in this case, I would say that this brain with possibly three-fourths of all prefrontal lobe tissue destroyed, appears to find difficulty in registering more than one stimulus at a time. This finding is not inconsistent with the conception that our frontal lobes enable us to become aware of an increasing number of simultaneous impressions." This conclusion may be endorsed in principle; question may be raised about some of its details, but these are not important here.

I once saw a juggler at the circus give a remarkable demonstration of simultaneous performance. Lying on his back, he twirled, on the tip of his left foot, a wheel whose rim was set with torches, the plane of the wheel being horizontal; at the same time, in a vertical plane, he twirled a small hoop with his right foot, while with his hands he juggled several balls. It would be absurd to suppose that such marvellous splitting of attention is akin to any

phenomenon of cerebral dissolution; on the contrary, it is a sign of a remarkably high *evolution*.

Gibbon, the historian, said [5] of the Emperor Julian that he "possessed such flexibility of thought, and such firmness of attention, that he could employ his hand to write, his ear to listen, and his voice to dictate; and pursue at once three several trains of ideas without hesitation, and without error." I am not concerned with whether this account is exaggerated, but only want to show that Gibbon, who greatly admired Julian, cited Julian's remarkable "capacity to split" as a sign of an advanced stage of mental development.

In the previous section I pointed out that the more immature the nervous system, the greater is its tendency to produce mass reflexes, *i. e.*, the greater is the tendency for large parts of the nervous system to act in unison. The converse is that *the more mature the nervous system, the more easily can its parts act independently of each other*. This principle is illustrated even in the very earliest years of life. Thus when a child learns to walk, he must at first put all his attention on his walking; his lower centers for walking are not yet sufficiently organized to be able to function automatically. With time and practice these centers become so highly organized as to be able to act independently of higher levels of the nervous system, so that (when this suits the occasion) they may carry out their function unaided and unsupervised; the child now can walk automatically while his thoughts are on something else. At maturity, nervous centers, being highly organized, possess in high degree the power of independent action, permitting the simultaneous performance of separate tasks to a degree that is sometimes amazing. Disease, since it reduces the degree of organization of nervous centers, curtails their power of independent action; they now have a greater tendency to act in unison, *i. e.*, the "capacity to split" is reduced and the tendency to mass reflexes heightened.

Again I offer an analogy between the cells of the cerebrum and a group of persons. In a factory employing many workmen, the unit, in one sense of the term, is the individual workman. In another sense of the term, we may speak of a unit—a functional or operating unit—consisting of the group of workmen needed to do a given

job. If the workmen are ignorant and inexperienced, it will take a great many of them to do the job: the "operating unit" will be a large one. If they are highly skilled and intelligent, only a few of them will be needed; the "operating unit" will be small. In a factory of intelligent workmen, there will be many small operating units functioning independently and simultaneously; many simultaneous jobs will be in progress. On the other hand, if the workmen are unintelligent, they will, as a group, show a lower capacity for doing several jobs simultaneously. So it is with the brain. When cerebral cells are immature or diseased, they tend to function in large operating units, *i. e.*, the tendency is in the direction of mass reflexes; the capacity for the simultaneous performance of two or more tasks is small. When, on the other hand, they are mature and healthy, they may function in small units which, for the moment, are independent of each other; the capacity for the simultaneous performance of two or more tasks is great.

Enke's experiments have no bearing on the thinking disturbance of schizophrenia. The only conclusion deducible from them is that schizothymes have more efficient brains than cyclothymes in matters requiring simultaneous attention. I am not concerned with the reliability of the experiments nor with the correctness of this conclusion; I only say that this conclusion has nothing to do with schizophrenia. It is absurd to suppose that there is a "capacity to split" shown in great measure by schizothymes and in even greater measure by schizophrenics—absurd, because this is saying that schizophrenics excel in a trait which measures cerebral evolution. It is like saying that people with heart disease can run faster than healthy people. In reality, Enke's experiments and the hypothesis of splitting in schizophrenia deal with entirely different things: Enke's experiments deal with a genuine splitting, while the splitting contemplated in the schizophrenia hypothesis is, as I have tried to show, but an illusion.

CONCLUSION.

The evolution of the cerebrum is manifested in the following ways. There is increasing "versatility" of the cerebrum, *i. e.*, its cells can enter into more complex and more numerous combinations, with a corresponding effect on the richness and complexity

of concept-formation. There is increasing autonomy of parts of the cerebrum, permitting these parts to act independently of each other; there is increasing capacity for "splitting of attention." In schizophrenia these trends are reversed. There is loss of cerebral "versatility," resulting in fewer and less complex concepts and in diminished capacity to differentiate concepts. There is loss of autonomy of the cerebral parts, resulting in loss of the "capacity to split" and in an increased tendency to mass reflexes. In other words, in schizophrenia there is not too much, but too little, splitting.

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VITAMIN C STUDIES IN ALCOHOLICS.*

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The effects of vitamin deprivation and vitamin feeding on brain tissue metabolism have recently been reviewed by one of us (S. B. W.).[1] In that paper, the rôles played by vitamins A and B in nerve tissue metabolism are discussed in detail. Concerning the function of vitamin C in nerve tissue metabolism much less is known. It will be the purpose of this paper to present some material pertaining to the possible rôle that vitamin C may play in nerve tissue metabolism, and, more specifically to present our results in making vitamin C studies on 103 alcoholic patients on the psychiatric and neurological wards of Bellevue Hospital.

Vitamin C studies on the blood and spinal fluid as well as the five hour excretion test of Wright (see below) were carried out on a large group of normal individuals. Our results which will be reported elsewhere are given in the accompanying charts. The figures for blood confirm those previously given by Farmer and Abt[2]; our figures for spinal fluid (which it will be noted vary with the age of the individual, decreasing as he grows older) are higher than those previously reported by Plaut and Bulow.[3] This discrepancy, we feel, is probably due to the difference between the American dietary and that prevailing on the Continent. Our results with the five hour excretion test parallel those reported by Wright and his coworkers.[4] (See Chart 1.)

Vitamin C estimations on the blood and spinal fluid were made on most of the alcoholic patients, and, in a few instances, the urinary excretion test. We found the use of this latter test on alcoholic patients inadvisable because of the lack of careful coopera-

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tion required on the part of the patient. The method of Farmer and Abt [2] was used in determining the vitamin C levels of the blood and spinal fluid. This method estimates only that portion of the ascorbic acid in the plasma and spinal fluid which occurs in its reduced form, and all the knowledge available at present seems to point to the fact that it is a fairly accurate index of vitamin C concentration in these particular body fluids. The five hour excretion test is carried out as follows: The patient has no breakfast on the morning of the test. At 9 a. m. the patient voids, and immediately afterward, one gram of cevitamic acid (Cebione-Merck)* in 10 cc. of normal saline is injected intravenously. The patient is asked to limit his fluid intake to the amount normally consumed at meal time, although variations do not markedly affect the excretion of vitamin C. All the urine passed for the first five hours is collected in dark brown bottles acidified to a pH of 3 with sulfuric acid and kept at ice box temperature; this is then immediately titrated for vitamin C content. Wright and his coworkers [4] have shown that about 80 per cent of the amount to be excreted in 24 hours will be excreted within the first five hours and that normal individuals should excrete more than 400 milligrams of the test dose within the first five hours. We have confirmed this. They believe, furthermore, that this test is the most accurate index of tissue saturation with vitamin C.

CLINICAL MATERIAL STUDIED.

The material presented consists of 103 patients who were admitted to Bellevue Hospital Psychiatric and Neurological Divisions with a history of chronic alcoholism. They formed the following diagnostically labelled groups:

Group I: chronic alcoholism without psychosis or peripheral neuritis (9 cases).

Group II: chronic alcoholism with peripheral neuritis (8 cases).

Group III: alcoholic hallucinosis with mild peripheral neuritis (10 cases).

Group IV: alcoholic hallucinosis (35 cases).

* This material has geen generously donated by Merck and Company, Rahway, N. J.

Group V: alcoholic hallucinosis immediately following recovery (6 cases).

Group VI: delirium tremens (14 cases).

Group VII: Korsakow's psychosis (5 cases).

Group VIII: alcoholic encephalopathy (5 cases).

Group IX: miscellaneous group (5 cases).

Group X: admission diagnosis changed (6 cases).

The diagnoses in all these cases were checked by the hospital discharge diagnosis and in appropriate instances, by confirmatory follow-up letters to the state hospitals where some of these patients had been sent. These latter diagnoses were accepted as final. Our vitamin findings were not included in the hospital chart and the diagnoses were made by the ward and visiting physicians on clinical criteria and other appropriate laboratory tests.

GROUP I: CHRONIC ALCOHOLISM WITHOUT PSYCHOSIS OR PERIPHERAL NEURITIS (9 CASES).

This group consists of patients most of whom had been admitted to the psychiatric service on several occasions. Some were picked up on the street in a drunken stupor. When they recovered they were found to be normal mentally and without evidences of gross neurological changes. The average vitamin C figures for this group fall within our normal range; although of the 9 cases, the vitamin C content of the blood in five and of the spinal fluid in two, is slightly below normal.

GROUP II: CHRONIC ALCOHOLISM WITH PERIPHERAL NEURITIS (8 CASES).

In no instance, were there normal vitamin C figures for either blood or spinal fluid. Five hour urinary excretion tests were done on two of these patients. The figures in both cases were low (118 mgms.; 264 mgms.).

GROUP III: ALCOHOLIC HALLUCINOSIS WITH MILD PERIPHERAL NEURITIS (10 CASES).

In only one patient, a woman of 36, did the vitamin C level of the blood and spinal fluid even approximate normal; the figures for the remaining 9 cases fell far below normal.

GROUP IV: ALCOHOLIC HALLUCINOSIS (35 CASES).

The lowest blood level recorded for this group was 0.20 milligrams per cent; the highest, 0.48 milligrams per cent. The spinal fluid vitamin C levels were correspondingly low: 0.67 milligram per cent for the age group 36-59 years; and 0.53 milligram per cent for the one patient included in the range 59-70 years. These figures if compared with the quotations for blood and spinal fluid of normal individuals are exceedingly low.

GROUP V: ALCOHOLIC HALLUCINOSIS IMMEDIATELY FOLLOWING RECOVERY (6 CASES).

These determinations were made on 6 cases of alcoholic hallucinosis immediately following recovery. The diet of Bellevue Hospital contains a basal amount of vitamin C. The average blood and spinal fluid findings were higher than in the previous group—but still not up to normal levels.

GROUP VI: DELIRIUM TREMENS (14 CASES).

Here again, in no instance, are there normal figures for vitamin C in either the blood or spinal fluid.

GROUP VII: KORSAKOW'S PSYCHOSIS (5 CASES).

The figures for vitamin C levels in both the blood and spinal fluid are consistently low. In one instance, a normal figure for the spinal fluid obtains although even in this case that of the blood is low. Interestingly enough, the patient with a high vitamin C content in the spinal fluid (2.48) had been presented at conference, where he was considered by many a case of schizophrenia.

GROUP VIII: ALCOHOLIC ENCEPHALOPATHY (5 CASES).

In every case we studied the vitamin C level in the blood and spinal fluid was much below normal.

GROUP IX: MISCELLANEOUS GROUP (5 CASES).

Two of these cases were chronic alcoholics with general paresis. Both have figures slightly subnormal for the vitamin C content of the blood and in the one case where the vitamin C content of the spinal fluid was estimated it was found to be normal. We have

been able to confirm these figures by others obtained from vitamin C estimations on blood and spinal fluid of patients with general paresis. One patient, a chronic alcoholic diagnosed as involutional melancholia had blood vitamin C figures below normal, with normal figures for the spinal fluid. Two alcoholics with toxic psychosis (namely " F " and " M ") had both low vitamin C content in the blood and spinal fluid. These findings fit in with the results obtained by Bullowa and his coworkers [5] who, working on both laboratory animals and patients, observed: (1) That in many infections and intoxications the vitamin C content of the tissues of laboratory animals was reduced; (2) that in patients who had infections or intoxications there was a decreased urinary excretion of vitamin C. They suggested that the increased metabolism in these conditions was associated with an increased destruction of the vitamin in the tissues. (3) That cevitamic acid acts not only as an oxidative factor in normal respiratory processes, but also has a neutralizing rôle in various pathological conditions other than scurvy.

GROUP X: ADMISSION DIAGNOSIS CHANGED (6 CASES).

This group is probably the most interesting. It consists of six patients on whom vitamin C studies had been made and recorded and then in the course of our routine check up we found that the clinical diagnosis had been altered. In 3 cases, the diagnosis was changed from alcoholic hallucinosis to general paresis. In all three, the blood vitamin C was subnormal (all were chronic alcoholics); in two, the spinal fluid figures were within normal limits while in the third case, a man of 57, the spinal fluid was just below normal. In 2 cases, a diagnosis of paranoid schizophrenia was eventually made following one of alcoholic hallucinosis on admission. Blood studies in one and spinal fluid studies in the other closely approximated normal figures. Again it should be recalled that both patients were alcoholics although final clinical opinion concurred that the alcoholism was only incidental to the personality disintegration and *not* the causative factor. In one case, an admission diagnosis of general paresis was made in an alcoholic. Vitamin C figures were very low in both the blood and spinal fluid; serological studies were negative. The discharge diagnosis was alcoholic hallucinosis. These results suggest that vitamin C studies may be of practical aid to the neuropsychiatrist.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)
				Chronic alcoholism without psychosis or peripheral neuritis.		
B.	M.	32	98.6		0.83	3.60
C.	M.	34	98.6		0.27	1.40
B.	F.	35	98.6		...	2.77
M.	F.	35	98.6		0.43	...
H.	M.	35	98.6		0.76	3.30
W.	F.	37	98.6		0.52	2.50
C.	M.	42	98.6		1.22	3.22
L.	F.	66	98.6		0.86	3.45
M.	M.	68	98.6	Paranoid individual.	0.25	1.39
					0.64 av.	2.78 (20–35 yrs.) 2.86 (36–59 ") 2.41 (61–83 ")

CHART 1.—Group I: Chronic alcoholism without psychosis or peripheral neuritis.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)	Over 450 mgms. in 5 hours following intravenous injection of 1000 mgms. cevitamic acid. (Wright.)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)	
				Chronic alcoholism with peripheral neuritis.			
V.	M.	23	98.6		0.49	0.58	
S.	M.	34	99.0	Nerve tenderness—tremulous.	0.30	1.61	
M.	M.	38	98.6		0.29	0.53	118 mgms.
P.	M.	40	98.6		0.29	...	
S.	F.	47	98.6		0.29	0.48	
H.	M.	47	98.6		0.40	0.65	
C.	M.	55	98.6		0.43	1.36	264 "
McL.	M.	55	98.6		0.44	1.09	
					0.37 av.	1.10 (20–35 yrs.) 0.82 (36–59 ")	

CHART 2.—Group II: Chronic alcoholism with peripheral neuritis.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)	Over 450 mgms. in 5 hours following intravenous injection of 1000 mgms. cevitamic acid. (Wright.)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)	
				Alcoholic hallucinosis with mild peripheral neuritis.			
S.	F.	21	99.4		0.20	0.93	
B.	F.	24	98.6		0.28	...	
M.	M.	31	100.0		0.21	0.59	
L.	M.	32	99.8		...	0.30	
C.	F.	36	99.0		0.55	2.09	
H.	M.	37	98.6		0.26	0.66	
B.	M.	47	100.0		0.35	...	
W.	M.	52	98.6		0.22	0.45	
K.	M.	59	98.6		0.22	0.73	
L.	M.	59	...		0.38	0.77	
					0.23 av.	0.61 (20–35 yrs.)	
					0.32	0.88 (36–59 ")	

CHART 3.—Group III: Alcoholic hallucinosis with mild peripheral neuritis.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)	Over 450 mgms. in 5 hours following intravenous injection of 1000 mgms. cevitamic acid. (Wright.)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)	
				Alcoholic hallucinosis.			
B.	M.	20	98.6		0.30	1.11	
S.	F.	24	98.6		...	0.87	
W.	M.	29	98.6		0.29	0.61	
S.	M.	31	99.8		0.25	0.91	
R.	M.	32	99.2		...	1.02	
D.	M.	33	98.6		0.31	...	
P.	M.	35	98.6		0.33	0.54	
G.	M.	35	98.6		0.23	0.69	
B.	F.	35	98.6		0.30	0.61	
					0.29 av.	**0.80 (20–35 yrs.)**	

CHART 4.—Group IV: Alcoholic hallucinosis.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Alcoholic hallucinosis.			
B.	M.	36	98.6		0.29	0.72	
M.	M.	36	99.2		0.21	0.92	
R.	M.	36	98.6		0.29	0.48	
C.	M.	37	99.6		0.42	1.08	
R.	M.	38	98.6		0.34	0.68	
S.	F.	38	98.6		0.25	1.15	
M.	M.	39	98.6		0.35	0.56	
M.	F.	40	99.6		0.45	0.84	
T.	M.	41	98.6		0.35	0.55	
H.	M.	42	98.6		0.48	0.56	
M.	M.	42	98.6		0.40	0.95	
P.	M.	43	100.0		0.40	0.58	
D.	M.	44	98.6		0.23	...	
P.	F.	45	101.2		0.25	0.73	
S.	M.	45	100.6		0.30	0.50	
P.	M.	45	98.6		0.31	0.83	
L.	M.	45	98.6		0.29	0.50	
D.	M.	45	98.6		0.24	0.83	
M.	M.	47	98.6		0.29	0.50	
N.	F.	48	101.0		0.20	0.66	
J.	M.	51	98.6		0.22	0.75	
P.	M.	52	98.6		0.25	...	
R.	M.	54	98.6		0.22	0.72	
L.	M.	55	99.6		0.48	...	
N.	M.	56	98.6		0.23	...	
					0.31 av.	0.67 (36–59 yrs.)	
J.	M.	66	98.6		0.37	0.53	

CHART 4.—Group IV: Alcoholic hallucinosis.

CHART 4.—Group IV: Alcoholic hallucinosis.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)
				Alcoholic hallucinosis (recovered).		
M.	F.	24	98.6		0.30	1.38
S.	M.	32	98.6		...	1.14
G.	M.	38	98.6		0.32	1.94
W.	M.	42	100.0		0.63	1.39
B.	M.	45	104.0		0.38	1.75
R.	M.	49	98.6		0.27	1.69
					0.38 av.	1.27 (20–35 yrs.) 1.69 (36–59 ")

CHART 5.—Group V: Alcoholic hallucinosis immediately following recovery.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)	Over 450 mgms. in 5 hours following intravenous injection of 1000 mgms. of cevitamic acid. (Wright.)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)	
				Delirium tremens.			
B.	M.	21	99.0		0.32	0.95	
T.	M.	25	100.0		0.25	1.14	
D.	M.	29	99.4		0.29	1.14	
R.	M.	29	98.6		0.24	...	
H.	M.	29	101.0		0.29	0.59	
B.	M.	44	99.6		...	1.11	
W.	M.	46	98.6		0.24	...	
M.	M.	49	99.6		0.31	1.00	
K.	M.	50	99.2		0.29	0.68	
M.	M.	50	99.6		0.38	0.68	
L.	M.	50	99.8		0.31	0.42	
W.	M.	53	99.6		0.22	...	
G.	F.	56	...		0.38	...	
H.	M.	62	99.6		0.29	1.14	
					0.28 av.	0.96 (20–35 yrs.)	
					0.30	0.77 (36–59 ")	
					0.29	1.14 (60–83 ") (1 case)	

CHART 6.—Group VI: Delirium tremens.

CHART 6.—Group VI: Delirium tremens.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)	Over 450 mgms. in 5 hours following intravenous injection of 1000 mgms. cevitamic acid. (Wright.)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)	
				Korsakow psychosis.			
W.	M.	42	98.6		0.33	2.48	
K.	M.	44	100.8		0.34	0.48	
F.	M.	45	98.6		0.24	0.83	
S.	M.	50	98.6		0.38	0.47	
K.	M.	63	98.6		0.25	0.55	
					0.32 av.	1.07 (36–59 yrs.)	
					0.25	0.55 (60–83 ")	

CHART 7.—Group VII: Korsakow's psychosis.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–50 ") 0.51 (61–83 ") (Plaut & Bulow)	Over 450 mgm. in 5 hours following intravenous injection of 1000 mgms. cevitamic acid. (Wright.)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)	
				Alcoholic encephalopathy.			
D.	M.	24	98.6		0.30	0.50	
D.	M.	35	98.6		0.29	0.81	
S.	M.	36	98.6		0.43	0.60	
M.	M.	40	98.6		0.28	...	
K.	M.	45	98.8		0.20	1.22	
					0.30 av.	0.66 (20–35 yrs.)	
					0.30	0.91 (36–59 ")	

CHART 8.—Group VIII: Alcoholic encephalopathy.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)	Urinary excretion.
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.) 1.97 (36–59 ") 0.51 (61–83 ") (Plaut & Bulow)	Over 450 mgms. in 5 hours following intravenous injection of 1000 mgms. of cevitamic acid. (Wright.)
					0.6–1.3	2.98 (10–20 yrs.) 2.64 (20–35 ") 2.54 (36–59 ") ... (61–83 ") (W., W., & M.)	
				Miscellaneous.			
S.	M.	25	98.6	Chronic alcoholic; G. P.	0.49	...	
F.	M.	32	99.0	Alc.; conv.; D. T.'s; Tbc.	0.20	...	
B.	M.	36	98.6	Chronic alc.; G. P.	0.46	2.78	
M.	M.	43	101.0	Alc.; pneumonia; toxic psychosis.	0.40	0.58	
G.	M.	56	98.6	Chronic alc.; involutional melancholia.	0.35	2.20	

CHART 9.—Group IX: Miscellaneous group.

Name.	Sex.	Age.	Temp.	Diagnosis.	Vitamin C findings. Blood. (Milligrams per cent.)	Vitamin C findings. Spinal fluid. (Milligrams per cent.)
				Normal quotations.	0.7–1.2	1.77 (20–35 yrs.)
						1.97 (36–59 ")
						0.51 (61–83 ")
						(Plaut & Bulow)
					0.6–1.3	2.98 (10–20 yrs.)
						2.64 (20–35 ")
						2.54 (36–59 ")
						... (61–83 ")
						(W., W., & M.)
				General paresis.		
S.	M.	27	98.6	(Diagnosis on admission:	0.49	...
B.	M.	36	98.6	Alcoholic hallucinosis.)	0.46	2.78
Z.	M.	57	98.6		0.35	1.16
				Paranoid schizophrenia.		
H.	F.	38	98.6	(Diagnosis on admission:	...	2.10
C.	M.	49	98.6	Alcoholic hallucinosis.)	0.59	...
				Alcoholic hallucinosis.		
N.	F.	48	101.0	(Diagnosis on admission: Chronic alcoholic with general paresis.)	0.20	0.66

CHART 10.—Group X: Admission diagnosis changed.

Discussion.

These are impressive data. They indicate that *alcoholics without peripheral neuritis or psychosis tend to have normal vitamin C levels in the blood and spinal fluid whereas alcoholics who have peripheral neuritis or alcoholic psychosis have subnormal vitamin C levels in the blood and spinal fluid.* What do these figures mean? We cannot as yet determine their full significance. Before any valid conclusions can be drawn from this work, the following questions must be answered.

First: Is the vitamin C level of the blood and spinal fluid as accurate an index of tissue saturation with vitamin C as the five hour urinary excretion test? We are at present attempting to correlate the blood and spinal fluid vitamin C levels with the five hour excretion test (after a saturation dose of cevitamic acid). The results show a rather consistent parallelism.[6] In addition, Abt, in a recent discussion of a paper by Youmans,[7] states: "From our experience to date, we feel that the level of reduced cevitamic acid in the blood (fasting specimen) is indicative of tissue saturation. Blood tolerance curves and 24 hour urinary excretion tests bear this out." Greenberg and his coworkers [8] also working on ambulatory individuals came to the same conclusion. Furthermore, Plaut and Bulow [9] formulated a similar correlation between the vitamin C level of the spinal fluid and the *urinary* excretion of this substance. Even if we grant that variations do occur and they *do,* certainly in any large series of cases, individual errors would become negligible, and certain trends would manifest themselves.

Second: Is vitamin C deficiency in alcoholics an index of general vitamin deficiency? Obviously this cannot be so in *all* cases, for if it were, all of our vitamin C deficient patients would tend to have peripheral neuritis.

Third: Is the lowered vitamin C level in cases of alcoholic peripheral neuritis and psychopathy due to a diminished vitamin C intake or assimilation or does the coincidental increase in total metabolism peculiar to the alcoholic states *utilize* vitamin C and *thereby* lower the blood and spinal fluid levels? Jolliffe [10] has shown that there is an estimated inadequate intake of vitamin B_1 in patients with alcoholic peripheral neuritis which may be corrected by giving sufficient amounts of vitamin B_1. It is probably also true that these

alcoholics take in inadequate amounts of vitamin C although at present there is no reliable data on the subject. In addition, it has been shown (Mosonyi [11]) that the daily administration of thyroxin to guinea pigs markedly reduces the vitamin C content of the liver and suprarenal glands of these animals. Do both inadequate intake and increased metabolism combine to give the low figures? Probably both factors are influential. At any rate, *whatever* the cause, the vitamin C level of these individuals is below that found in normal healthy persons, and is markedly lowered in cases of alcoholic peripheral neuritis and alcoholic psychopathy.

Fourth: Does vitamin C play a rôle in the metabolism of nervous tissue? We do not know, but several facts suggest that it may. Tissue extraction work has shown that vitamin C is present in very high concentrations in the brain and adrenals, both nervous tissues. We have confirmed this work. In addition, the findings of Plaut and Bulow [12] as well as our own figures show very definitely that under normal conditions vitamin C is present in relatively high concentrations in the spinal fluid. These facts would seem to indicate that vitamin C has a significant bearing on the functioning of nervous tissue where it likely acts in conjunction with glutathione.[1] Malmberg and von Euler [13] have shown that the deprivation of vitamin C during a period of three weeks diminished the C content of guinea pig brain to about $\frac{1}{5}$ of normal but scarcely affected that of a rabbit's brain. This apparent discrepancy is readily understood if we realize that a rabbit deprived of vitamin C in its diet can synthesize it, whereas guinea pigs, like humans, are unable to synthesize their own, being dependent on an outside source.

That the brain tissue of younger animals has a higher oxygen consumption than that of older animals of the same species is now a well established fact.[14] Vitamin C determinations (Plaut and Bulow [3]) in brain tissue of younger animals show it to have a relatively higher vitamin C content than the same tissue of older animals. In addition, the vitamin C content of the spinal fluid decreases with age. The relatively high respiration rate of brain tissue in all mammals and more particularly in younger individuals, may therefore be functionally related to the high ascorbic acid content of the brain. This suggests a possible relationship between the vitamin C content of the spinal fluid, the brain and the brain's functioning.

Fifth: Why do alcoholics even after prolonged deprivation of vitamin C rarely develop scurvy? An answer to this query is suggested by Jolliffe's as yet unpublished experiences at Bellevue Hospital.[15] Scurvy in alcoholics is very rare but when present it is invariably associated with peripheral neuritis. Since it is a known fact that vitamin B is excreted much more rapidly than is vitamin C the reason for the relative scarcity of scurvy in alcoholic patients may be due to the fact that their neuritic signs usually bring them to the hospital before they have had an opportunity to develop frank signs of scurvy.

Sixth: Why are mental and neurological signs so rare in scurvy? No detailed studies, to our knowledge, have been made on this aspect of the subject. Such studies might prove of value.

Vitamin C may play also a neutralizing rôle in preventing infections of the central nervous system. This is suggested by the work of Jungeblut [16] wherein he showed that multiple paralytic doses of poliomyelitis virus when mixed with very small amounts of crystalline vitamin C were rendered non-infective as determined by the intracerebral injections of such mixtures into monkeys.

Conclusions and Summary.

1. The reduced ascorbic acid content in the blood and spinal fluid was studied in a large group of normal individuals and the results are here given.

2. The reduced ascorbic acid in the blood and spinal fluid was studied in 103 alcoholics. In two instances, the five hour urinary excretion test (Wright) was done. The studies indicate that chronic alcoholics without peripheral neuritis or psychosis tend to have low normal vitamin C content of the blood and spinal fluid whereas alcoholics with peripheral neuritis or the various forms of alcoholic psychosis tend to have subnormal vitamin C content of the blood and spinal fluid. *It would be futile to draw any further conclusions at the present time but these results seem to emphasize the nutritional factor in the production of nervous and mental changes in chronic alcoholics.*

3. It is suggested that vitamin C likely plays a rôle in the metabolism of nervous tissue.

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DISCUSSION.

DR. EDWARD E. MAYER (Pittsburgh, Pa.).—Nerve tissue metabolism is gradually becoming understood and the Bellevue Laboratory from which this study comes has again made a worthwhile contribution to this subject.

While no definite conclusions have been reached, this study points to a vitamin C deficiency in the alcoholic groups who have a neuritis or a psychosis. Alcoholism with peripheral neuritis and psychosis have, according to this study, subnormal vitamin C levels. The pertinent question is asked whether this is due to an increase in total metabolism coincident to chronic alcoholism or whether it is an inadequate intake that is responsible. The normal levels obtained in simple alcoholics seem to answer this question. But why is there any difference? What is the quality that gives us neuritis?

The advisability of adding extra vitamin C to the diet of alcoholic patients, particularly the younger ones, even if no scurvy symptoms are present, is indicated. Whether the saturation point of brain tissue for vitamin C is materially changed by the chronic ingestion of alcohol because of increased oxidation is an important point that still remains open. We know that young animals have a higher oxygen content in their brain tissue.

It is hoped that the authors will continue their studies. It is hardly necessary to state that it is from chemical and metabolism studies that much of our future therapy will come. It might be advisable to use the old capillary resistance test of Hess and Fish to detect latent scurvy in alcoholic cases. Ascorbic acid may be deficient not because of alcoholism alone but from a general dietary deficiency. Therefore not only brain tissue but also liver and adrenal metabolism must be studied in these cases. The amount of vitamin C in the adrenal system has something to do with the problem of its deficiency in the brain tissue. Does its depletion here cause a desire for alcohol? Is perhaps the vitamin C difference between the neuritic alcoholic and simple chronic alcoholic patient dependent upon liver and adrenal gland metabolism? Does vitamin C deficiency accompany or precede vitamin B_1 and B_2 deficiency? Let us hope that next year the essayists will have more to tell us upon this subject. Perhaps some day it will be possible to obtain a lead into what is, after all, the heart of the subject; namely, what is the anlage or constitution that predetermines the type of man that becomes an alcoholic addict? And with this predisposition, what concomitant social factors influence the body, such as fatigue, low diet, sex life, etc., that may have something to do with the metabolism of the body?

These clinical problems cannot be separated from the research studies of the laboratory, such as was given us by the essayists.

Dr. Stanley Cobb (Boston, Mass.).—I was interested in the remarks about the lesions of scurvy, especially, and I would like to ask if we might consider the lesion described by Wernicke in the midbrain as perhaps a scurvy lesion. It is a proliferation of the small vessels in the minute hemorrhages.

Dr. Herman Wortis (New York).—Dr. Mayer's comments are very pointed. At no time in doing these vitamin C studies did we feel that we were answering the problem of alcoholism. As a matter of fact, we have no evidence that vitamin C is the *important* vitamin in alcoholic deficiency states.

It is probably true that vitamins B and A have a more important functional relationship to nerve tissue metabolism than does vitamin C. We do, however, feel that we have evidence that vitamin C plays some rôle in nerve tissue metabolism and we further feel that the vitamin C deficiencies noted are an index of general undernutrition in our neuritic and psychotic alcoholics.

One striking fact has emerged in our alcoholic studies at the Bellevue Psychiatric Hospital namely, the number of neuritic and psychotic alcoholics that we see as compared to the number of similar cases that are seen in private practice. The reason for this is not entirely clear, but since our Bellevue patients come for the most part from the lower economic and social strata, their diet is usually very poor. I do not believe they drink any more than the alcoholics that one sees in private practice but one thing is certain, they do not eat as much. We feel, therefore, that the vitamin and general nutritional factors are important in at least precipitating neuritic and psychotic disorders in chronic alcoholics.

We certainly do not feel that vitamin deficiency is what makes a man drink. Obviously there are social, economic, cultural, emotional and psychological, perhaps even chemical factors, that drive a man to drink. If, however, he does go on to develop a peripheral neuritis or an alcoholic psychosis, we feel that the nutritional factor is a very important one. We do not underestimate the toxic effects of alcohol but we think that they have perhaps been over-emphasized.

Dr. Cobb's question concerning the etiology of the midbrain lesions in Wernicke's polioencephalitis is interesting. The only related pathological work I am aware of was done by Dr. Charles Davison at the Montefiore Hospital in New York City. He placed guinea pigs on a scorbutic diet and while he did find changes in the peripheral nerves and in the central nervous system of such animals, there were similar changes in animals that were totally starved. He was therefore unwilling to attribute the changes noted to avitaminosis C. The midbrain, however, was singularly free from pathological lesions.

ANALYSIS OF SPOKEN LANGUAGE OF PATIENTS WITH AFFECTIVE DISORDERS.

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The voice and spoken language of patients with manic depressive and allied syndromes were analyzed to determine what changes occurred associated with particular groups of symptoms. The speech of patients has always played a prominent part in forming clinical impressions. However, little attention has been paid to the exact alterations to voice and language which combine to build the characteristics commonly thought of as associated with certain psychiatric syndromes. General descriptive terms have been used such as "monotonous," "dull," "lifeless," "vivid," "dramatic" and "emphatic." It is of interest to learn what gives this "coloring" to speech and whether or not specific speech characteristics are consistently associated with certain syndromes or with certain of the formal disorders of the stream of speech such as in "flight of ideas" or "pressure of speech."

In order to simplify the problem, the initial study was limited to a group of patients with affective disorders. In all the patients studied, retardation or acceleration, and depression, euphoria or irritability were clearly manifest. Special attention was paid to language characteristics which seemed to be consistently associated with particular syndromes. Changes in language with changes in the clinical picture were also studied. The conclusions drawn were based on a study of the speech of 40 patients. Sample cases are described here to illustrate the general principles arrived at from the study of the larger group of cases.[2]

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[2] We wish to express our thanks to Dr. R. L. Leak of Middletown State Hospital who made available to us a number of the patients, and to Dr. Sarah Mazick who cooperated with us in this study.

TECHNIC OF LANGUAGE ANALYSIS.

The speech of patients was recorded with microphone and phonograph equipment on cellulose acetate discs. The recordings contained the patients' spontaneous speech, elicited by questions from the psychiatrist, and short reading selections whenever conditions permitted. Each record was then studied from many repeated playings, until a satisfactory description of the linguistic features could be formulated.

No attempt was made to set up a systematic inventory to describe all features of speech, since this would be neither feasible nor useful. In the course of listening to the records and analyzing them, a group of descriptive criteria was gradually built up. The aim was to select for analysis those formal characteristics of language which served to differentiate one patient from another. The final list of criteria, however, does not pretend to be definitive; further study will undoubtedly suggest additional characteristics of language for analysis and more refined methods of describing the criteria included in the list.

The criteria employed in the language analysis are presented in the following outline, with explanatory notes where these seem necessary.

I. Articulatory movements:

Lax, vigorous. (Although one may receive a general impression of the character of articulatory movements throughout a person's speech, the pronunciation of the stop consonants t, d, k, g provides the clearest indication. These consonants are produced by a closure of the tongue against the palate, followed by a release. In the speech of some persons, however, the closure is only partial or loosely made, and the release is lax; d or t, for example, will sound like a single-trilled r. In the speech of others, the closure is tight and the release is crisp and vigorous; here the d or t may be accompanied by a slight click.)

II. Pitch:

A. Range of pitch:

Wide, narrow. (In English the greatest changes of pitch are ordinarily found at the end of sentences: the pitch falls at the end of declarative statements and rises at the end of interrogations. But rises and falls that extend over a wide pitch range in the speech of one person will be flattened in the speech of another. Some people speak with so narrow a pitch range that their sentences often end without any perceptible rise or fall; this phenomenon will be referred to as the "hovering" tone.)

B. Pitch changes:
   1. General character: gliding, step-wise.
   2. Frequency.
   3. Variety of patterns: diversified, stereotyped.

III. Emphatic accent:

A. Type:

Rhetorical, contrastive. (Two phonetically distinct types of accent are used for emphasis in English. The rhetorical type can be identified, for example, in "I saw a tall man," when the word "tall" is protracted in length; a slightly raised pitch and a strong force of articulation may also accompany this accent, which expresses the speaker's surprise or wonder concerning the reference of the accented word. In the contrastive type of accent, the intonation which normally comes at the end of the sentence is displaced to the emphasized word, the emphasis being most commonly employed to contrast this word with another one, expressed or implied: in "I saw a tall man" (*i. e.*, not a short one), the word "tall" takes the falling tone which otherwise would appear on "man." Generally a strong force of articulation also marks the contrastively accented word.)

B. Frequency.
C. Types of references receiving emphatic accents.

IV. Tempo:

A. Individual words: Drawled, choppy.
B. Stream of speech:
   1. General speed: slow, fast.
   2. Changes of speed.
      a. Frequency of change.
      b. Manner of change: gradual, sudden.
C. Pauses:
   1. Type: prosodic (pauses between phrases), hesitating (pauses within phrases).
   2. Frequency.

V. Resonance:

A. Placement:

Oral, pharyngeal, nasal. (The oral cavity is the primary resonator in speech. But many people when speaking extend and enlarge the pharyngeal cavity, which acts as a resonance chamber for the voice and gives it a "throaty" quality. Nasality results when the voice resonates in the nasal passage and escapes, either partially or wholly, through the nose.)

B. Glottal activity:
   1. Type: Glottal closures, glottal rasps. (Complete glottal closures occur in some dialect forms of English. Otherwise they are seldom found outside of gross speech disturbances. Much more common are the glottal rasps, produced by an incomplete closure of the glottis; the entire glottis is made to vibrate, with some vertical as well as lateral motion. When rasping occurs, a throaty trill infects the speech.)
   2. Position in statements: at beginning, at end.
C. Changes in volume:
   1. Frequency of change.
   2. Manner of change: gradual, sudden.
D. Timbre: Hoarse, shrill, breathy.

VI. Vocabulary and phrasing:

A. Level of style: Colloquial, formal, pompous.
B. Words referring to concepts of degree:
   1. Type: Extreme, neutral. (Concepts of degree can be conceived as distributed on a continuum going from extreme minus to extreme plus. Words referring to either extreme, such as "wonderful" or "terrible, terrible" in V.R.'s record (Case IV.), are to be distinguished from the relatively neutral and colorless words, such as "nice" in W.N.'s record (Case I.).)
   2. Frequency.
C. Tag phrases (*e. g.*, "you see," "I dunno," "you know").
D. Repetition of phrases, of phrase patterns.

VII. Syntax:

A. General features of syntactic structure.
   1. Coherence: Tight, loose.
   2. Progression: Continuous, broken.
   3. Elaboration:
      a. Degree of syntactic elaboration: rich, meagre.
      b. Variety of techniques used for elaboration.
B. Statements:
   1. Type: Statements consisting of a word, of a phrase, of a total predication.
   2. Length.

VIII. Response:

A. Rapidity in initiating response.
B. Length of response, in terms of number of statements.
C. Relation of response to question: Rapport with question throughout response; rapport with question only at beginning of response; response avoiding question; response unrelated to question.

D. Interrelation of statements in response: Statements clustering about a single theme; statements progressing from primary to secondary themes; statements jumping from one theme to another.
E. Character of references in response:
1. References to interlocutor.
2. Proper names, titles, dates, numbers.
3. Apologies, corrections, interrogations.

IX. Accessory vocal activity: Sighing, yawning, coughing, clearing the throat, laughing, weeping.
X. Special features:

A. Comparison of reading with spontaneous speech.
B. Peculiarities associated with particular contents.
C. Recurrent themes.

I. Language in Patients with Depressive Syndromes.

A. CLASSICAL DEPRESSIONS.

The patients included in this group all experienced circumscribed illnesses characterized predominately by sadness of mood and retardation. Some showed agitation, tension and self-accusatory ideas. Insomnia, anorexia and constipation were usual. Some had experienced similar illnesses previously with recovery. A smaller number had had episodes of euphoria and acceleration.

A marked laxity of articulatory movements characterized the speech of these patients. With its sparing use of pitch and accent, their voice had a dead, listless quality: changes of pitch covered a narrow tonal range and were predominantly step-wise rather than gliding; hovering tones often appeared at the end of sentences, where speakers of English usually employ the broadest pitch changes; intonations tended to recur in the same stereotyped patterns; and emphatic accents were either rare or absent entirely. Their speech gave an impression of being slow and halting, because of the frequent appearance of hesitation pauses interrupting the flow of their phrases. In its resonance, their voice was pharyngeal and sometimes nasal; glottal rasping was present, and this, added to the pharyngeal resonance, gave their speech a "throaty" quality. They made little effort to use precise words or elaborate phrases: they spoke in an informal and colloquial style; words referring to concepts of degree had a neutral and colorless character, and they

were infrequently used. The sentences of these patients were often loose and fragmentary in construction; syntactic elaboration was meagre, and the syntactic devices tended to be of the simple additive type, such as coordination and parallelism. Responses were slowly initiated, and they were brief, consisting of only one or a few statements; the statements themselves were short, often being nothing more than a phrase. The brevity of their responses gave the patients little opportunity to wander from the point of the question.

As the condition of these patients improved, certain changes appeared in their language. The most consistent changes were observed in the characteristics of syntax and pitch. Their sentences became more tightly constructed and richer in syntactic elaboration; a greater variety of devices was used to achieve a more elaborate syntactic structure. Some patients began to employ longer statements and responses, and a more ambitious style of phrasing. All patients, however, showed changes in the use of pitch: the range of pitch widened out, though it never approached the extensive pitch range of patients showing manic syndromes; gliding tones, though usually short and infrequent, began to appear in their spontaneous speech; and the patterns of pitch became more varied. But pharyngeal resonance, glottal rasping, pauses of hesitation, and lax articulatory movements persisted in the speech of these patients.

CASE I.—W. N., a 30-year-old American survey engineer first suffered from a period of low spirits at the age of 27 years (October 1934). For about five months he exhibited depressed mood, decreased motor activity, insomnia, anorexia, increased shyness and diminished sexual potency. During the following year he was irritable, sexually promiscuous, alcoholic in episodes; and unable to hold any steady employment. He was finally brought to the hospital by the police department for taking pot shots at telephone poles with a repeating rifle. In the hospital he was at first irritable, excitable, sullen and threatening. Later he became elated, exceedingly active and noisy and at times assaultive. He remained overactive, overtalkative, distractable, and elated for the following six months though there was a gradual decrease in these symptoms. During the period of improvement he was discharged. In December 1936 he again exhibited definite retardation, sadness and disinterestedness. He spoke of difficulty in concentrating and of suicidal impulses. He was readmitted to the hospital on March 3, 1937. From then until his discharge on May 22, 1937 he remained continuously depressed, but with a gradual diminution in the severity of his symptoms.

During the last period of hospital care the three speech recordings were made that are reported below.

The patient graduated from high school at 18 years of age. He had some subsequent training in engineering. He worked regularly as a surveying engineer until six months after his marriage at the age of 26 years. Since then he has been able to work only irregularly. Marital adjustment was described as good before the onset of his illness. Since there has been much quarreling, infidelity and talk of divorce. There are two children. The patient was described as shy, sensitive, quiet and self-conscious with a tendency to worry over finances. Intelligence superior. Family history was negative for mental illnesses.

Clinical picture on March 12, 1937: Patient showed marked motor retardation. Appeared and felt more sluggish in the morning than in the afternoon. Looked sad and gloomy and described his mood as one of hopelessness and uselessness. No spontaneous speech, but answered questions briefly. Smiled slightly when addressed. Appetite good. Early morning awakening. No constipation. Kept busy all day with ward activities but experienced some difficulty in concentration.

Recording of March 12, 1937:

Excerpts.

(How long have you been in our clinic, Mr. N—?) Little more than a week. (Have you made any trips recently, in the last eight or ten years?) What do you mean? (Taken a vacation or gone away on a trip some place?) Why, last summer I did. (Will you tell us a little bit about that?) I—just—up in Massachusetts. (Where did you go?) Out in Cape Cod. (Could you tell us a little bit about what you did?) Why, I—how to describe it, what you want. I did some motor-boating, some fishing, some climbing. (What is it like there?) A lot of pine trees and the land, nice beaches, fresh water ponds.

Language Analysis.

Articulatory movements: Lax.

Pitch: In reading the pitch is practically a monotone; in spontaneous speech the pitch range is very narrow. Intonations are made by step-wise changes of pitch. Many of the sentences, even in spontaneous speech, end in a hovering tone, without any perceptible drop.

Emphatic accent: None.

Tempo: The reading is very rapid (about 200 words per minute), with few pauses and practically no variations in speed. The spontaneous speech is slower and shows more variety in speed. The patient evidently has difficulty in beginning his statements, which start off with very slow pacing, low volume, and glottal rasping. Pauses appear frequently in the spon-

taneous speech; they are of the hesitation variety, occurring in the middle of phrase units: *e. g.*, "A lot of pine trees and/the land . . . ."; "I made a/ swing . . . ."

Resonance: There is a great deal of pharyngeal and some nasal resonance, both in reading and in spontaneous speech. Glottal rasps are frequent, sometimes released orally with a mid-vowel, sometimes released nasally. These rasps generally occur at the beginning of statements and infect the first few words. Changes in volume are gradual, increasing from a low volume at the beginning of statements to a full volume at the end.

Vocabulary and phrasing: The style of phrasing is colloquial. Concepts of degree are expressed in vague and neutral terms, such as "some," "nice," "sort of."

Syntax: The sentence structure is loose, and often broken and fragmentary. The meagre syntactic elaboration is achieved almost entirely by parallel enumeration. Statements are short, sometimes being merely phrase-responses.

Response: The responses are short, nearly all of them consisting of single statement. They are sometimes preceded by a brief delay and are always slow in getting started. In several of the responses, the patient avoids giving an answer by indicating that he has not grasped the question: *e. g.*, "What do you mean?" "Why, I—how to describe it, what you want."

Clinical picture on April 7, 1937: Motor retardation was still marked with somewhat greater output of energy in the afternoon than in the morning. Mood sad though he stated he felt somewhat better. Friendly when approached, but did not speak spontaneously. Answered questions willingly. Sleep and appetite good. More interested in occupational therapy and able to do more complicated tasks.

Recording of April 7, 1937:

EXCERPTS.

(Will you tell us about some of the work you've been doing downstairs?) Carpentry work. I made some book-ends, hammered out an ash-tray. (Out of . . . . ?) Out of pewter. (Pewter.) The book-ends are wooden. Done some rug-weaving on the large loom. (Could you explain a little bit about the technique of setting up a loom?) We set it up with three different colors, red, brown, and tan. The strings have to alternate through the pedals, I think they call them, front and back, and then through what they call the beader in front. (And how is the actual weaving done?) The material that the rug is made of is passed back and forth with a shuttle or bobbin, and the different pedals are raised and lowered with foot-pedals.

LANGUAGE ANALYSIS.

Articulatory movements: Lax.

Pitch: The pitch range has widened slightly since the previous recording, but it is still narrow, particularly in reading. Changes of pitch are again

made by step-wise movements. Hovering tones at the end of sentences are still present.

Emphatic accent: One emphatic accent, of the contrastive type, occurs in this recording.

Tempo: The reading is still done with unvarying rapidity and with few pauses. Statements begin slowly in spontaneous speech. Pauses of hesitation are still frequent: *e. g.*, "We set it up with/three different colors, red, brown, and tan. The/strings have to alternate through the/pedals . . . ."

Resonance: The nasal resonance is no longer perceptible, but the pharyngeal resonance persists. Statements again begin with glottal rasping and a weak volume that gradually rises toward the end.

Vocabulary and phrasing: The style is colloquial. Words referring to concepts of degree are as rare and neutral as before.

Syntax: A few phrase-responses occur in this recording, but the statements are much longer than before. The sentence structure is tighter and more continuous. Coordination of statements and parallel enumeration of words and phrases are still the main techniques of syntactic elaboration.

Response: The responses are longer, some of them containing two or three statements. But they are still delayed and slow in getting started. The patient no longer attempts to avoid the question in his response.

Accessory vocal activity: The patient clears his throat a few times during the recording.

Clinical picture on May 22, 1937: Patient gave the appearance of being quiet and reserved, but there was no distinct motor retardation present. Initiated conversations and offered spontaneous comments. Smiled freely and appropriately in a friendly manner. More sociable in ward contacts. Family stated he was "like himself" for the first time since the onset of his illness in October 1934 and that he talked as freely and appeared as cheerful as he did when in good health. The patient stated he was not yet entirely well, that he still felt somewhat slowed up and sad though greatly improved over his former condition.

Recording of May 22, 1937:

EXCERPTS.

(Would you tell us about some vacation or trip that you took sometime?) Any special one? (Yes, any one . . . .) I was up in Cape Cod about a year ago—June. Did some fishing, climbing, swimming. (Tell us a little bit about that part of the country.) Sort of rolling sand hills, pine trees. The roads are very good. The swimming is good. (And what are your plans now?) Find some kind of outdoor work for the summer, and then either continue in that or find something inside for the winter.

LANGUAGE ANALYSIS.

Articulatory movements: Lax.

Pitch: The pitch range has again widened slightly. Gliding tones now appear for the first time; even the reading, which had been particularly monotonous in pitch, now contains a few glides. Hovering tones still persist, but they are not as frequent as in the previous recording.

Emphatic accent: This recording has three emphatic accents of the contrastive type.

Tempo: As in the previous recordings, the reading is very rapid and shows little variation in speed; the reading gives an impression of greater variety than before, however, because of the gliding tones and the widened range and greater frequency of pitch changes. Statements are begun slowly in spontaneous speech. Hesitation pauses still persist: *e. g.*, "Sort of rolling/ sand hills . . . ."; "Find some kind of out-/door work for the summer . . . ."

Resonance: The pharyngeal resonance in speech and the glottal rasps at the beginning of statements are still present.

Vocabulary and phrasing: The style remains colloquial and informal. The patient uses more words expressing degree concepts, but they are still neutral.

Syntax: In its syntactic features, this recording is much the same as the previous one. It has a few phrase-responses; but most of the responses contain full statements with a fairly well-organized and unbroken sentence structure and with parallel construction as the main elaborating technique.

Response: The responses are of about the same length as before; they are again made up of two or three statements. The patient is quicker in initiating his response to a question, but, once begun, his responses start off slowly.

Three recordings were made of the speech of a 30-year-old American engineer at successive stages of improvement in the depressive phase of a manic depressive illness. The clinical picture was characterized by low spirits, marked motor retardation, poverty of speech, difficulty in concentration, and suicidal impulses. Speech showed: lax articulatory movements throughout all recordings; narrow pitch range widening slightly in successive recordings; stepwise pitch changes with a few glides appearing in the last recording; hovering tones at the end of statements, appearing less frequently in the final recording; emphatic accents absent in the first recording, present but infrequent in later recordings; pharyngeal resonance with glottal rasping at beginning of statements; nasal resonance only in first recording; rapid tempo in reading, slower and more varied tempo in spontaneous speech; slow tempo at beginning of response; pauses of hesitation; informal level of style; loose and broken sentence structure becoming tighter and more

continuous after first recording; meagre syntactic elaboration with little variety in syntactic techniques; short statements, several being phrase responses; slow initiation of response, becoming more rapid in final recording; short responses, containing one statement in first recording, later consisting of two or three statements.

B. STATES OF DISSATISFACTION, SELF-PITY AND GLOOM.

In this group were included patients experiencing more or less chronic states of dissatisfaction, self-pity and gloom. The illness usually was not circumscribed, and the mood showed more responsiveness to changes in the situation than is seen in classical depressions. Somatic symptoms were less pronounced. In some cases there had been previous episodes suggesting "classical" depressions of several months' duration, but at the time of examination the patient was rather in a rut of self-concern, discontent and self-pity.

In the characteristics of their voice and language, patients in this condition were sharply differentiated from those experiencing the more classical type of depression. Their articulatory movements were more vigorous, and their changes of pitch, which showed a generous use of long gliding intonations, extended over a wide tonal range. In spite of the gloomy or complaining content of their speech, the use of pitch gave their voice a lively and even cheerful coloring. This liveliness of pitch was particularly noticeable when the patients were reading or discussing certain topics; in connection with other contents, however, these patients often fell into a stereotyped and repetitious use of pitch patterns, though they still employed long gliding tones and a wide pitch range. Patients in this group also responded quickly to a question, and their responses were varied in length, tending neither toward the long and rambling responses of patients showing manic syndromes nor toward the consistently brief responses of depressed patients. In certain features of their speech, however, these patients resembled the depressed patients: their resonance was pharyngeal; glottal rasping was prominent; and their style of phrasing was colloquial and informal, with none of the "showing-off" characteristic of patients with manic symptoms.

Over a period of time no consistent changes could be observed in the speech of these patients. Changes in their speech seemed to be associated, rather, with types of content.

CASE II.—A. L., a 60-year-old German housewife who had always been in good health became despondent in the spring of 1927, wept frequently and had to stop her work of cleaning houses by the day. After six months there was some improvement but she continued to be depressed with weeping for a week or so out of every month. At times she was well enough to work. Four years ago she claimed a female cousin had cheated her in a contest for a prize and was turning her friends against her. She asked her friends to stop visiting her. In November 1936 she became more depressed, wept frequently in the morning and complained that everyone disliked her and was slighting her. She spoke of dying soon and becoming a "mere mass of bones." Sleep was broken during the ten year period but was worse in the first six months and again since November 1936. Appetite was poor in 1927 and anorexia and constipation were complained of in recent months. During her stay in the Psychiatric Clinic (January 9, 1937, to March 13, 1937) she appeared quiet, somewhat retarded and seclusive. At times her spirits were low and she wept. Again she was cheerful and smiled spontaneously. She stated that other patients spied on her to help her to get better, that she was going to die but that she wanted to live to see her grand-daughter grow up. She spoke of regretting her past and her marriage to an alcoholic husband. Appetite was poor at first, but improved later. Weight changed from 128 to 136 pounds. Usually she awoke at 4:00 a.m. to 5:00 a.m. unless given sedative, though she slept well during the last two weeks in the Clinic. There was a gradual improvement in her spirits so that she was predominately cheerful in the last few weeks of her stay.

The patient was a sociable lively child who did well in school in Germany until the age of 12 years when she had to go to work. She came to America to relatives at the age of 17 years and married one year later. Her marriage was predominately unhappy which patient ascribes to her husband's alcoholism. Sex relations were unsatisfactory to the patient. Coitus interruptus was used for contraception. Patient states she remained with her husband only because of their three children and because she had nowhere to go. She is described as having a reactively labile mood with marked premenstrual tension. Before her illness she was jolly, energetic and liked company. She was never able to say "no" to anything. Patient was the oldest of thirteen siblings. One brother was moderately alcoholic; one sister very seclusive. Four siblings died in infancy with convulsions.

Recording of March, 2, 1937:

EXCERPTS.

(Will you tell us how you spend the time in the hospital?) Well, I get dressed in the morning. If it's a nice day, I go outdoors for a little while. Then I go down to Occupational Therapy and try to rest for about fifteen

minutes and then get my dinner. And I rest again for about fifteen minutes or so, and then I do some handwork until it's time again to go to O.T. And of course if it's visiting hours, then I have visitors. And after that I do handwork again. And in the evening after our supper we—sometimes we play a game of cards, sometimes we do a little handwork but not very much. I read the paper. But lately I've read the paper when I went to bed, because I couldn't sleep very well, and Miss D— thought it was a good idea if I try to read for a little while and go to sleep right away. So I didn't read my paper until late. (Tell me a little bit about your family, who all you have at home.) Who I have at home? (Yes.) I have my husband and two sons at home. (What do your sons do?) My one son he works in Y— S— Company, and the other one works in M—'s, P.S.M—'s Company on S— Street. He's a drummer. He drums work there once a week.

Language Analysis.

Articulatory movements: Vigorous.

Pitch: Gliding intonations cover a wide pitch range. In reading, the patient employs a variety of pitch patterns. In portions of the spontaneous speech, however, the glides are stereotyped: long rising glides having the same pitch pattern appear at the end of phrases and statements. This stereotyped use of pitch is noticeable, for example, throughout most of the first response given in the excerpts. But, toward the end of this response, when the patient speaks about reading the paper, she suddenly increases the volume of her voice and makes use of diversified pitch patterns.

Emphatic accent: Only one emphatic accent, of the contrastive type, occurs in this recording.

Tempo: The rate of speech is average (about 160 words per minute). Changes in speed are infrequent and gradual; the speed remains fairly even throughout. Pauses of the prosodic type occur frequently.

Resonance: The quality of the voice is marked by pharyngeal and nasal resonance. There is a great deal of glottal rasping, particularly when the volume is low; the rasping is apt to appear at any position in the statements. Changes in volume are frequent and sudden. The patient speaks with a breathy timbre.

Vocabulary and phrasing: The level of style is colloquial. Neutral words are used to refer to degree concepts, but even these are infrequent. The patient tends to repeat phrase patterns.

Syntax: The sentences are tightly constructed, and their progression is continuous. The syntactic elaboration is fairly rich, the sentences being developed by a variety of techniques. The statements vary considerably in length; all of them are complete predications.

Response: The patient is quick in beginning her response to a question. She shows a good deal of flexibility in the length of her responses: some responses contain only a single statement, others are made up of two, four, or more than a dozen statements. Rapport with the question is maintained throughout a response, regardless of its length. As the statements progress,

they develop the theme suggested in the question. There are several proper names and numbers in the recording.

Accessory vocal activity: The patient clears her throat in the course of reading.

One recording was made of the speech of a 60-year-old German housewife who suffered from a depression of about ten years' duration. Although her condition had fluctuated considerably during this period, her mood was predominately gloomy, with spells of weeping and regrets over her past. She felt that people were against her and were slighting her. Her speech showed: vigorous articulatory movements; wide pitch range with gliding tones, the pitch patterns being stereotyped in certain responses, more diversified in other responses and in reading; emphatic accents rare; average speed of utterance, with an even pace maintained; prosodic pauses frequent; pharyngeal and nasal resonance, with glottal rasping prominent; frequent and sudden changes in volume; colloquial level of style; degree concepts expressed by neutral words; phrase patterns repeated; tight and continuous sentence structure, with elaboration fairly rich and syntactic techniques diversified; statements varied in length, all of them being complete predications; responses initiated quickly and also varied in length; rapport with question maintained throughout response.

II. Language in Patients with Manic Syndromes.

In this group were included those syndromes characterized predominately by acceleration with euphoria or irritability. Many showed grandiose trends. The illnesses were circumscribed. Many of the patients had had previous similar attacks or had experienced depressive episodes.

Patients with manic syndromes tended to be "good" speakers, according to the prevailing notions of "good" speech; one of the patients, after listening to her record, remarked in surprise that her speech "sounded awfully highbrow." These patients, more than those of any other group, were inclined to enunciate words clearly and crisply; that is, their articulatory movements were vigorous, though sometimes only isolated portions of their speech showed this vigor of articulation. No glottal rasping interfered with the clarity of their voice. In the characteristics of pitch and accent, their speech had liveliness and vitality; they used a wide pitch range

with gliding tones; changes of pitch appeared frequently; and emphatic accents were generously distributed in their speech. Changes of volume also occurred frequently. Their pauses, being of the prosodic type, gave a smooth and graceful flow to their utterance; in some cases, however, when the prosodic pauses were exaggerated in length and frequency, the speech took on the character of theatrical declamation. Most of these patients showed an ambitious tendency to employ an elevated style; but this feature was not so clearly apparent in the speech of patients who had had a very limited experience with reading and no contact with the more formal types of linguistic expression. In referring to concepts of degree, these patients used relatively intense and extreme words. Their sentences were often richly elaborated, and a variety of syntactic devices was used. They spoke primarily in complete predications, seldom making use of phrase-statements. Their responses were quickly initiated and, like their statements, tended to be long. These patients seemed to be especially fond of employing personal names, place names, dates, and other particularized references in their response. In the shorter responses, they were usually able to stick to the point of the question; but in long responses, they gradually lost rapport with the question by passing, as their response continued, from the primary point to secondary topics.

With improvement in their condition these patients showed a more relaxed articulation. Although gliding tones were retained, their range of pitch became narrower, and emphatic accents were used with more restraint. A few pauses of hesitation began to make their appearance. Where the syntactic structure had previously been loose and fragmentary, it now became more coherent and continuous. Employing shorter responses, the patients no longer wandered from one topic to another but maintained better rapport with the question. Names and dates became less frequent in their responses.

CASE III.—F. R., a 61-year-old business man was in low spirits with weeping spells for one month. Garrulousness, irritability, confusion and disorientation then appeared in the setting of infectious polyarthritis, acute pharyngitis, heavy sedation (chloral hydrate and bromide) and finally bronchopneumonia. After three weeks with improvement in his physical condition all signs of confusion and disorientation disappeared. He showed marked pressure of speech, flight of ideas with superficial associations and motor overactivity. He sang, whistled, danced and talked incessantly. He de-

scribed his mood as happy. During the next two months these features gradually decreased in intensity. During this period the three records of his speech were made which are analyzed below.

At the age of 34 the patient had to reduce his work activities for several months because of loss of energy and increased sleepiness. No definite lowering of spirits is recalled. Patient completed high school and business college with a good scholastic record. After the age of 21 he worked industriously and with fair success, sometimes holding several positions of responsibility simultaneously. At the age of 31 he married a domineering, anxious, tense woman. In their thirty years of marriage there was little sharing of interests or activities, but no open hostility and some personal mutual dependency. There were no children. The patient was described as generous, friendly, conscientious and possessed of an unusual high energy endowment. Intelligence high average to superior. Family history was negative for nervous and mental illness.

Clinical picture of February 27, 1937: At this time overactivity was marked with singing, whistling, dancing and almost continuous talking with marked flight of ideas. Appetite and sleeep were good. He frequently repeated, "Oh, I feel so happy. If you felt half as happy as I do, I don't know what you would do."

Recording of February 27, 1937:

EXCERPTS.

(How old are you, Mr. R—?) I was born January 29, 1876, in G—, Connecticut, United States of America. My father was born in F—, County of K—, England, and came to this country when—shortly before he was one year old. Of course, you remember in those days, the old days of the sailing vessels—my grandfather's often told me, never forgotten—he almost—nearly three weeks away from the shore of New York by the very worst winds from the time it took almost three weeks to land . . . . Excuse me, I don't know just all the details. I don't like to talk too much. If you think, in any way—you'll just pinch me. I don't like to wander. Pleased to give you just what you want, just as briefly as possible.

LANGUAGE ANALYSIS.

Articulatory movements: In spite of the feebleness of this patient's physical condition, his articulation shows a good deal of crispness and vigor; the stop consonants are occasionally released with a perceptible click.

Pitch: Long glides characterize the intonations, which have a wide pitch range. The frequency with which the same pitch patterns recur gives the speech a sing-song quality; every third or fourth word, on the average, is pronounced with a long rising glide.

Emphatic accent: There are a number of emphatic accents, primarily of the rhetorical type, in this recording. These accents fall on most of the qualifiers

of approximation ("almost," "nearly," "about," "not quite"), which occur frequently.

Tempo: Individual words are drawled, and the flow of speech is extremely slow (about 80 words per minute). The rate of speed remains fairly constant, although in two or three instances there is a spurt of more rapid speech; these spurts are found in the apologetic remarks, such as the "Excuse me" passage presented in the excerpts. Prosodic pauses are very frequent.

Resonance: The speech has full oral resonance. But the volume is weakened by a husky, breathy timbre of voice; sometimes the voice drops to a hoarse whisper.

Vocabulary and phrasing: The style of phrasing is elevated and pompous. Degree concepts receive two types of expression. On the one hand, intensity of degree is frequently referred to throughout this recording by such words as "never," "very worst," "all," "so many." Words expressing approximate degree, on the other hand, are clustered in statements that contain temporal references: in addition to the qualifiers of approximation used in the excerpts, the patient says in speaking of his mother, "I'm not quite so sure of the date, but she was at least—about—not close, you understand, but about—eighty-two years old at the time of her death."

Syntax: Although a variety of techniques is employed to achieve a syntactically elaborate style, the sentences are loose and broken in construction. All of the statements are complete predications, most of them being of considerable length.

Response: The patient is quick in initiating a response. His responses are long; the entire recording of about four minutes is made up of only two responses. The frequent dates, ages and names of persons, and names of places are usually given in full detail. The recording contains several apologetic responses, in which there are references to the interlocutor. It is only in the first sentence of his response that the patient takes up the topic suggested by the question; as the response continues, he wanders from one topic to another, returning again and again to the theme of his father.

Clinical picture of March 25, 1937: At the time of this recording the gross motor overactivity had disappeared. There was no dancing, whistling or singing, but he emphasized his meaning when talking with the free use of gesticulations. He was still overtalkative and his speech showed moderate pressure and flight of ideas. His mood was predominately cheerful though there were occasional short periods of sadness.

Recording of March 25, 1937:

EXCERPTS.

(You were telling me about what Mrs. R— has been doing in the last six years?) Well, six years, it's a matter of twenty-five years. (Tell me

about it.) Well, speaking of it, Dr. M—, is that correct? (Yes.) Dr. M—, I called her attention to the yellow glow that you will notice when passing through G— on United States Route #1. I had passed to the right. We pass through R— Gardens, and for a distance of a thousand feet every other shrub is a yellow Forsythia, which later is replaced by green leaves and becomes a shrub of beauty throughout the entire season. This will be followed a little later by a white shrub . . . . (Now, how have you been feeling recently?) I'm feeling fine, only I wish my appetite wouldn't drop off, because, really, I told the doctor that if he would just cut my portions down, I'd feel better, because if there was only some poor soul in need, why I could feed a family on what I send out to the kitchen. I love to do those things, and I always have, and it's my life. If I can do something for someone else, I'm happy.

LANGUAGE ANALYSIS.

(NOTE: There are marked differences in speech between (1) the patient's reading, (2) his discussion of his wife's landscaping interests, and (3) the description of his own health and of happenings on the hospital ward. These portions of the recording will be referred to by number.)

Articulatory movements: Vigorous.

Pitch: The pitch range in 3 is still as wide as in the previous recording, but in 1 and 2 the range is narrower. Changes of pitch are made by gliding tones. The sing-song quality has disappeared; throughout this recording there is considerable variety of intonational patterns.

Emphatic accent: Both the rhetorical and contrastive types of emphatic accent occur, but they are less frequent than in the previous recording.

Tempo: Individual words are again drawled. The speech is still fairly slow and deliberate in 2 (about 100 words per minute), and even in 1 (about 120 words per minute), but it moves at a faster pace in 3 (about 160 words per minute). Changes of speed are most noticeable in 3. Prosodic pauses are fewer and shorter, particularly in 3.

Resonance: The resonance is oral, as before. There is much less huskiness in the voice, and changes in volume are greater and more frequent.

Vocabulary and phrasing: The style of phrasing is pompous and sententious in 2, but in 3 there is a marked change to a more colloquial level. Degree concepts are expressed more frequently and intensely in 3 than in 2. The patient no longer uses words referring to approximate degree.

Syntax: The syntactic structure is tighter and more progressive than before, though there is some tendency to ramble in 3. The structure is made elaborate by means of a variety of syntactic devices. Statements are made by complete predications, and most of them are long.

Response: The patient again begins his response quickly. The responses are still long, though not as profuse as before. The tendency to give the names of places and of persons (among them the interlocutor) still persists. There are no apologetic responses. The patient now shows more ability to stick to a given topic throughout his response and to develop that topic

in an orderly sequence of statements, particularly in 2; in 3 he tends to lose the point of the question as he goes on with his response.

Clinical picture of April 8, 1937: By this date, all evidence of general motor overactivity had disappeared. He no longer gesticulated while talking. Flight of ideas was not apparent but circumstantiality and garrulousness were marked. His wife stated that he was distinctly more talkative than usual, but she noted his ability to stick to the topic of conversation and to discuss profitably their plans following his discharge from the hospital. Mood was predominately cheerful, but not strikingly euphoric.

Recording of April 8, 1937:

EXCERPTS.

. . . . Going toward Boston you will pass through R— Gardens, where the shrubs at this time of the year, the yellow blossoms of the Forsythia you will immediately notice, and the yellow glow makes it a very beautiful sight. Alternating with the Forsythia is—it's a white flower, I don't remember the name. There is a white flower which follows very soon after the yellow Forsythia is gone. (What do you like to do yourself in the way of a hobby?) Well, I don't know but that politics may be my hobby as well as anything else. What I really enjoy—all I really enjoy in politics is the good fellowship. (Any special reasons for being a Republican?) Well, that I've—I've always believed that the principles—the Republican principles were correct. And there might be a reason for that in this, that our town is naturally a Republican town, and I've been active in the—the—well, the public executive offices. I've been a member of the Board of Trade there for a period of over twenty-five years.

LANGUAGE ANALYSIS.

Articulatory movements: More relaxed than before, but still crisp.

Pitch: As compared with the previous recording, this one shows a narrower pitch range throughout. Gliding tones are shorter and less frequent. The patient still uses a variety of pitch patterns.

Emphatic accent: The frequency of emphatic accents is about the same as before, but the contrastive type occurs in greater proportion.

Tempo: The drawling of individual words persists. In talking about his wife's landscaping interests, the patient speaks slowly (about 80 words per minute); he speaks at a faster pace when discussing his political hobby (about 155 words per minute). Changes of speed are frequent, but they take place more gradually than before. Most of the pauses are of the prosodic type, but a few hesitation pauses occur in this recording.

Resonance: The resonance is oral. Changes in volume are as great and frequent as before. The huskiness has disappeared from the voice.

Vocabulary and phrasing: The patient still shows a tendency to "speechify," particularly in discussing the landscaping activities of his wife. But the style of phrasing is more consistent throughout this recording which does

not show the marked change from one level of style to another, noticed in the previous recording. Intense words are used in referring to concepts of degree.

Syntax: Although they show a few breaks in continuity, the sentences are tightly constructed and do not display the rambling tendency characteristic of some portions of the previous recording. A variety of techniques is again used for syntactic elaboration. The statements are complete predications, of about the same length as before.

Response: The responses are quickly initiated, but they are shorter than before. References to names of persons and places are less frequent. In this recording the patient keeps to the point of the question throughout his response.

Three recordings were made of the speech of a 61-year-old business man at successive periods of improvement in a manic condition. The clinical picture was characterized by euphoria, marked motor acceleration with pressure of speech and flight of ideas. His speech showed: vigorous articulatory movements, relaxing slightly in the last recording; a wide range of pitch, becoming somewhat narrower in successive recordings; sing-song repetition of long gliding tones in first recording, replaced by variety of pitch patterns with shorter glides in subsequent recordings; emphatic accents frequent, the rhetorical type predominating at first, the contrastive type later; individual words drawled; slow stream of speech with pompous style in first recording and in patient's discussion of his wife's interests and activities; sudden spurts of speed in first two recordings, absent in final recording; prosodic pauses frequent in first recording, later becoming less marked, with pauses of hesitation appearing in last recording; full oral resonance; weak volume and huskiness in first recording, with changes of volume becoming greater and more frequent later; concepts of extreme degree referred to in all recordings, but approximate degree expressed only in first recording; syntactic structure loose and broken at first, becoming progressively tighter and more continuous in subsequent recordings; syntactic elaboration rich, with a variety of techniques being employed; statements made by long complete predications; quick initiation of response; responses long at first, becoming progressively shorter; names, dates, ages given in detail in first recording, less frequent in last recording; rapport with question only at beginning of response in first recording, tendency to wander persisting in patient's discussion of his own activities in second recording, but rapport with question maintained throughout response in final recording.

III. Language in Patients with Mixed Affective States.

The patients included in this group presented mixed pictures but with disturbances of affect leading. Of particular interest was the case reported below where acceleration and flight of ideas were associated with distress, apprehension, and self-accusatory trends. This patient's case is presented because her speech showed some striking departures from the characteristic phenomena encountered in the groups discussed above. Pitch changes, for example, are ordinarily utilized for phrase and sentence melody. But the wide pitch range and the gliding tones used by this patient were merely the pitch components of emphatic accents and did not enter into the melodic outlines of phrases and sentences. Changes of pitch not associated with the accents were slight and rare. Unlike the long sweeping glides found in the speech of patients with manic syndromes, the gliding tones of this patient were steep and sharp. The excessively numerous accents, the steep glides, the sudden changes in volume, the staccato pronunciation of words, the scant distribution of pauses, the rapid pace of utterance combined to give her speech a quick and jerky movement. Furthermore, the "flight of ideas" displayed by this patient was quite different in character from that manifested by patients with manic syndromes: instead of passing aimlessly from one topic to another, this patient seemed to be preoccupied with a set of topics that she discussed at length in a circular and incoherent fashion.

Case IV.—V. R., a 41-year-old housewife became anxious, tense, slept poorly and ate poorly in January, 1937. About three weeks later she wept, fell to the floor, stated she was dead, that her father was dead and that her husband and mother had not been fair to her father. She was admitted to the hospital on February 26, 1937. For two months she was quiet, cooperative, tidy. When spoken to she rambled at length declaring that she had mistreated her parents and that everyone else had been wonderful and had tried to help her. There was mild pressure of speech and slight tendency to clang association. Affect appeared inadequate. She giggled and laughed while making self-accusatory statements. Sensorium was intact. She slept brokenly two to six hours a night. Weight changed from 114 to 106 pounds. Pulse ranged from 78 to 120, usual pulse reading was around 90. There were present a mild thyrotoxicosis, rheumatic heart disease (?) with mitral stenosis and functional uterine bleeding, considered to be associated with partial menopause. After two days at home she returned markedly agitated, with great pressure of speech and activity. She talked or wrote incessantly. She filled every square inch of paper given her, printing in capitals with many

underlinings and marked flight of ideas. The content consisted of long lists of enumerations or self-accusations. She reiterated her belief that if she could be let out all the other patients could be let out too and there would be no suffering. She appeared markedly distressed, and made one suicidal attempt "to torture herself to set the others free." At times she refused to eat, banged on her door and struck at people who entered the room. Sensorium intact. Sleep markedly broken, even with hydrotherapy and sedation. She gained four pounds in weight.

Patient was finicky about food in childhood, and was shy, timid and seclusive. She left school at the age of 13 years and worked in factories and offices until her marriage at the age of 23 years. She had one pregnancy resulting in a daughter now age 15 years. Marital adjustment was fair though sex relations were unsatisfactory. Since 1931 she had three series of x-ray treatments for thyrotoxicosis. She was described as submissive, insecure, fearful about the impression she made on others, hesitant to meet people, cool with some menstrual irritability. Energy output was described as average with some increase in the evenings. Intelligence was superior.

Her father suffered from life-long "stomach trouble" and used his illness to dominate the family. Her only sibling, a brother, was known as a "rounder."

Clinical condition March 2, 1937: Motor activity was within normal limits. She giggled at times for no apparent reason. Frequently appeared bewildered. Questions were sometimes answered directly and relevantly and again were either not answered or were met with vague replies. There was a tendency for her to wander in her speech with moderate pressure and considerable spontaneous production. Associations were superficial with occasional play on words. Tended to refer everything to her guilty feelings and to laugh ruefully over her past mistakes. Slept brokenly two to six hours. She was neat, quiet and cooperative.

Recording of March 2, 1937:

EXCERPTS.

(Now, how long have you been in the hospital?) Two days, I think. (And will you tell us a little bit about your illness?) You mean what I just told you? (Some of that, yes.) It's such a jumble of confusion that—How far back do you want me to go on it? (Well, tell me a little bit how you first started not to feel very well.) Well, I really think I started to feel the worst when I thought my father was dead, and we had a terrible, terrible mixup, my husband yelling at him, I'm confused as to just what he said, except that he'd take care of the situation or something to that effect, is in my memory, and that he shouldn't ask me to do as much for him, that I was trying to do the best I could for him. He shouldn't be unreasonable. That's right, I think that's the words, that's what it amounted to. And then my father saying that he had never had anything, worked all his life and tried to save money, and that he hadn't wanted to—wanted him to—around, and

never wanted him to give him a ride downtown with him in the car. Quite a bit of yelling and hollering. As I say, it was all a terrible hubbub in my ear. And then I remember, it seems to me as though I put my arms around my father's neck and kissed him and kissed him, and begged him to live, and that he did. The reason he was so terribly down and out, I thought, was because I'd been starving him, thinking that he couldn't eat food because of the condition he had been in.

Language Analysis.

Articulatory movements: Fairly vigorous, but not markedly so.

Pitch: The range of pitch is wide, with rapid gliding tones punctuating the speech. But the steep glides are used in conjunction with the numerous emphatic accents; they do not form a part of the rising and falling pitch movement that ordinarily belongs to phrase and sentence units. Were it not for emphatically accented words, this patient's speech would have a narrow pitch range. The pitch patterns tend to be stereotyped, for much the same pattern recurs with each emphasis.

Emphatic accent: The emphatic accents are excessively frequent. Most of the sentences contain several: *e. g.,* "When the food ***did*** go back on him, in ***my*** mind I thought it ***was*** sort of a paralysis, and that he ***shouldn't*** take so much food, that he ***couldn't*** digest so much food, because in ***June*** he had a ***terrible, terrible*** vomiting spell and just ***shook, just*** as hard as he could from head to foot." The contrastive type of accent predominates, but the rhetorical type is also used.

Tempo: Individual words are pronounced in a choppy, staccato manner. In the stream of utterance, however, the rate of speed is average (about 170 words per minute). Changes in speed are slight and infrequent, but sudden. Short phrases and word-groups, rather than long portions of the speech, are marked by a quick spurt or by a sudden slowing down of speed. Pauses are infrequent; they are primarily of the prosodic type.

Resonance: The resonance is strongly pharyngeal, but there is no glottal activity. Because of the emphatic accents, which have a heavy force of articulation, the speech contains many sudden changes in volume.

Vocabulary and phrasing: The patient speaks in a colloquial style. Words referring to concepts of degree are frequent, and they express notions of an extreme type. There is a good deal of repetition of phrase patterns.

Syntax: The syntactic structure is loose and often incoherent. Several of the sentences are broken, and many contain syntactic fragments that have no structural relationship to the rest of the sentence. The syntactic elaboration is rich, exhibiting a variety of techniques. The statements vary in length; phrases as well as complete predications function as statements.

Response: The responses are initiated rapidly. Some of them are short, consisting of a single statement; but once the patient gets beyond three or four statements, she is apt to continue speaking until interrupted. In her short responses, she tends to avoid or interrogate the question, but she is able to maintain rapport with the question throughout a long response. Although the statements cluster about a single theme, the line of development from

one statement to the next is not always continuous or lucid. The patient refers to the interlocutor by pronoun. Apologies, corrections, and interrogations occur in this recording.

Accessory vocal activity: There is some laughter unrelated to the content at the beginning of the recording. In the course of spontaneous speech the patient sighs several times.

Clinical condition April 21, 1937: Markedly increased activity with marked pressure of speech. Profuse writings with much printing and underlining and piling up of superlatives and some superficial associations. Content entirely depressive and self-accusatory. Appears distressed, agitated and apprehensive.

Recording of April 21, 1937:

EXCERPTS.

I feel that the way I can help my husband and my B— the most, and my father, is to go home to them right now. And the entire hospital that has done so much, everybody in it, so many people, so much, that I can't even begin to speak about it really. I guess that's so—Mrs.—Mrs. B—, Mrs. D—, and all those families and all those people, doctors, nurses, so many that—that if I start to talk, I'm going to leave out somebody, and I'm not going to remember all the things that I should remember at all. And I want to do for my B—. I want to do all to my husband. And I can't see that I'm doing all to B—, my husband, or my father staying here, as I see it. I've been here so many weeks now, and I haven't profited by it, I feel, as I should have. And I don't feel I'm doing justice to any of these people who have been so kind by staying, because I feel as long as I stay, they stay. And in going home, I know that I will be the happiest person living. When I went home a week ago they—and came back, they said that I could be home when I was sure I could be happy. Well, no one could be happier than I, if that is going to make Mr. R— and B— happy, that is what I want more than anything in the world.

LANGUAGE ANALYSIS.

Articulatory movements: More vigorous than in the previous recording.

Pitch: In spontaneous speech the use of pitch remains much the same as before: extending over a wide pitch range, steep glides of a stereotyped pattern accompany the emphatic accents. In the previous recording, however, the patient's reading showed the same characteristics of pitch as her spontaneous speech. Now she reads in a narrow pitch range, without emphasis.

Emphatic accent: The emphatic accents are as frequent as before, with the contrastive type again predominating.

Tempo: Individual words are more staccato than before, and the stream of speech has quickened its pace considerably (to about 240 words per

minute). This hurried pace remains constant, with practically no changes in speed. Prosodic pauses occur, but they are infrequent.

Resonance: Pharyngeal resonance, without glottal activity, is still present; it is particularly marked in the patient's reading. Changes in volume are even sharper, for the emphatic accents have taken on greater volume and articulatory force.

Vocabulary and phrasing: The style of phrasing is colloquial, as in the previous recording. Words referring to concepts of degree are more numerous. Words expressing the type of degree concepts having to do with totality ("entire," "everybody," "all") are particularly prominent. The vocabulary has taken on a more intense and extreme character. Phrases and phrase patterns are frequently repeated.

Syntax: In their syntactic structure, the sentences are even more incoherent and fragmentary than before. A variety of techniques is employed in the construction of sentences, and the syntax is richly elaborated. The statements vary in length, though the longer ones predominate.

Response: The patient begins to speak before any question is asked. She continues talking for several minutes and does not stop when she is asked to read a short passage; only after another attempt is made to induce her to read, does she comply. A single theme, the patient's stay at the hospital, is involved in all the statements, but no continuous line of development is followed in discussing this theme. The sequence of statements is disordered and jumbled. There are no references to the interlocutor. Several proper names are used, and the recording contains apologies, corrections, and interrogations.

Accessory vocal activity: None.

Two recordings were made of the speech of a 41-year-old housewife who showed a syndrome of distress, bewilderment, apprehension, pressure of speech, flight of ideas and self-accusatory trend. Symptoms increased in severity in the interval between the two recordings. Her speech showed: articulatory movements increasing in vigor between the first and second recordings; emphatic accents excessively frequent, both in the reading and spontaneous speech of the first recording, later only in the spontaneous speech; accents of the contrastive type predominating; pitch changes determined primarily by emphatic accents, the glides with a wide pitch range falling on accented words; pitch patterns stereotyped; staccato pronunciation of individual words; speed of utterance considerably faster in second recording; pauses infrequent, prosodic in type; resonance pharyngeal; sudden changes of volume in both recordings, a stronger volume and articulatory force accompanying accents in second recording; colloquial style of phrasing; words

referring to degree concepts present in both recordings, more frequent and intense in second recording; syntactic structure loose and broken, but showing richness of elaboration with diversity of syntactic techniques; rapid initiation of response to question in first recording, speech in second recording initiated before examiner's question and continued after examiner's interruption; rapport with question maintained in responses of first recording; statements in each recording concerned with a single theme, but sequence of statements disordered and jumbled; apologies, corrections, and interrogations appearing in both recordings.

DISCUSSION.

The immediate problem of this study was to ascertain whether certain characteristics of language are associated with particular syndromes. The characteristics pertaining to different syndromes presented by 40 patients with affective disorders and the contrasting features of speech belonging to each syndrome have been described in detail. But more important than these immediate results are the broader problems raised by this investigation. Some of these problems are inherent in the study itself, for an inquiry which seeks to limit itself to an arbitrarily defined field within the domain of human behavior is laboring under self-imposed artificialities. Such artificialities cannot be avoided, but it is well to be aware of the problems and fallacies implicit in them, particularly when using a special and unfamiliar terminology that is apt to give our arbitrary concepts a spurious authority.

For purposes of descriptive analysis, it was necessary to isolate certain elements out of the totality of speech. The procedure of dealing with speech in terms of separate items is merely a convenience; it is not meant to imply that speech is regarded as being made up of any given number of designated items. As further study demonstrates relationships between the artificially isolated elements of language, this schematic treatment will progressively give way to a more realistic one. As a matter of fact, the descriptive data presented in this paper already suggest that certain features of speech belong together. Patients who employed gliding tones spoke in a wide range of pitch; conversely, patients using step-wise changes of pitch spoke with a narrow pitch range. If this connec-

tion between the character of pitch change and the extent of the range of pitch persists in future data, it will be valid to treat these two originally separate "elements" of pitch as a unitary phenomenon. Such relations, it should be noted, are permitted to develop from the descriptive material itself. Although the study must begin with the humble examination of supposedly independent items, it should discover relations and unifying principles as it continues.

Perhaps a more subtle fallacy than the itemized conception of speech is the danger of confusing formal identity with functional identity. It cannot be assumed that any given characteristic has the same interpretation in the speech of all persons. Clues for the functional interpretation of a speech characteristic can be found in the rôle which that element plays in the total economy of an individual's speech. And here again the descriptive data can supply evidence for placing an element of speech in its proper setting. It was found, for example, that patients with manic syndromes spoke with gliding tones covering a wide pitch range; the same features of pitch appeared in the speech of the patient V. R., (Case VII) whose case was discussed under the heading "Mixed affective states." As formal items, these pitch manifestations were identical in the two types of syndromes. But in the speech of manic patients the gliding tones and the wide pitch range were part of the melodic movement of phrases and sentences; in V. R.'s speech these characteristics of pitch were reserved for the emphatic accents and did not contribute to the melodic contours of her phrasing. Although these elements of pitch were formally the same, they played a different rôle in each of the two instances.

A study of the manifold ways in which the features of language are constellated comprises, however, merely one aspect of the interpretative problem. Except in the purely formal sense, speech is not a self-contained category of behavior. Together with other behavioral forms it provides external symbols of human functioning, and one can therefore expect to find relations between speech and other modes of human behavior. A crude beginning in this broader interpretative problem has been made in the attempt to assign a group of speech characteristics to each of the syndromes. Because of the complexity of the speech picture and the intricacy of the behavioral manifestations implied in the syndromes, it is not easy

to sort out the indices in speech of particular characteristics of behavior.

The present investigation provides only a few fragmentary hints concerning the more specific relationships. The occurrence of a loose and broken sentence structure in the more severe phases of the manic depressive syndromes, except in the states of dissatisfaction and self-pity, suggests that this feature of language may be indicative, not of any particular syndrome, but of the severity of the disturbance. It would also appear from the material of this study that articulatory vigor is a manifestation in speech of a general vigor of motor movements. But such relations, setting up certain characteristics of speech as the manifestation of a type or phase of behavior, can be studied to better advantage from a wider variety of syndromes.

In the preceding discussion, the attempt was made to point out that, beginning with a frankly analytic and descriptive approach, it is possible to develop the problems of this study by synthesizing the originally isolated elements of speech, by placing these elements in their proper configurative setting within the speech of individuals, and by discovering in the details of speech the manifestations of broader aspects of behavior. Other fruitful directions that can be taken by future study may be mentioned. The phenomena of pitch turned out to be of more significance for the description of speech than was suspected at the beginning of this investigation. An undoubtedly valuable contribution to the understanding of speech would be an intensive study of pitch, preferably with the help of a pitch discriminating apparatus that could give more accurate data than the unaided ear. In addition, in the present study, which was limited to small samples of speech from a number of patients, it was not possible to deal with types of content as affecting the formal characteristics of a patient's language; content seemed to be particularly important in determining changes in the speech of patients showing states of dissatisfaction, self-pity, and gloom. A study based on a fuller sampling of speech from individual patients could deal with the factor of content more effectively than was possible in this investigation. Much could be learned, too, from analysis of speech recordings taken at intervals over a period of years and studied in the light of a thoroughgoing investigation of the life course of the individual.

Enough has been said to indicate that this study does not pretend to solve any of the broader and, it must be confessed, the more significant problems of language. It is hoped that the materials presented here demonstrate the possibility of soberly examining the formal details of a sphere of behavior in which a luxuriant growth of speculation and impressionistic interpretation has flourished. If generalizations are deferred, it may be possible to gain a more realistic understanding of speech as a form of behavior.

Summary.

Clinical descriptions and language analyses are presented of four patients with affective disorders. The characteristics of speech are discussed which were most consistently observed in each syndrome as based on a study of 40 patients of which the four described in detail are representative. The observations are outlined in the following table:

	Classical depressions.	States of dissatisfaction, self-pity, and gloom.	Manic syndromes.
Articulatory movements	Lax.	Fairly crisp.	Vigorous.
Pitch range	Narrow.	Wide.	Wide.
Pitch changes	Step-wise; infrequent.	Gliding; frequent.	Gliding; frequent.
Emphatic accents	Absent or rare.	Infrequent.	Frequent.
Speech tempo	Slow.	Average.	.....
Pauses	Hesitating; frequent.	Frequent.	Prosodic; frequent.
Resonance	Pharyngeal, nasal.	Pharyngeal, nasal.	Oral, pharyngeal.
Glottal rasping	Present.	Present.	Absent.
Level of style.....	Colloquial.	Colloquial.	Elevated.
Degree concepts	Neutral; infrequent.	Neutral; infrequent.	Extreme; frequent.
Syntactic elaboration.	Meagre.	.....	Rich.
Syntactic techniques..	Limited.	.....	Diversified.
Initiation of response.	Slow.	Quick.	Quick.
Length of response...	Short.	Varied in length.	Long.
Statements in response	Developing single theme.	Developing single theme.	Passing from one topic to another.
Rapport with question.	Throughout response.	Throughout response.	At beginning of response.

One atypical case, presenting a mixed state of the manic-depressive group, is described in which pressure of activity and speech was associated with depression, apprehension, bewilderment and self-accusations. Speech analysis showed vigorous articulatory movements; wide pitch range; gliding pitch changes associated with accents; fast speech tempo; infrequent, prosodic pauses; pharyngeal resonance; absence of glottal rasping; colloquial level of style; extreme and frequent degree concepts; rich syntactic elaboration with diversified syntactic techniques; quick initiation of responses; lengthy responses dealing with single theme but disordered in sequence.

A REVIEW OF THE WORK ON EXTRA-SENSORY PERCEPTION.[1]

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Seven years of work under the direction of Professor J. B. Rhine of Duke University on the phenomena of telepathy and clairvoyance have resulted in two books, a number of journal articles, a new journal (*The Journal of Parapsychology*), some similar work at other institutions, a few published criticisms, a number of reviews, a weekly radio program, and a widespread revival of interest in the occult. The actual experiments responsible for all this publication are relatively simple. "Prime piece of apparatus is a pack of cards bearing five designs: a circle, a star, a plus sign, a rectangle, a band of three wavy lines. The pack consists of 25 cards, five cards of each design. To observe clairvoyance, he (Rhine) asks his subjects to identify the cards one by one as the pack lies face down. To observe telepathy they are asked to call cards imagined in the mind of another person" (28: 44).[2]

Detailed individual results have never been published, but results in the mass and in terms of averages are presented in *Extra-sensory Perception.* Unfortunately the organization of this work presented in this book is chronological rather than logical. This order plus the absence of an index makes it necessary to make many marginal cross references if one hopes to know all that Rhine says about a given point. In trying to review Rhine's work, Willoughby has apologized: "we are still in some trepidation lest some basic control whose absence we have criticized should turn up presently in some unexpected place" (31: 202). The reviewer for the Lon-

[1] I am indebted to H. O. Gulliksen, M. W. Richardson, D. C. Adkins, and G. F. Kuder, my statistical colleagues at the University of Chicago Board of Examinations, for their critical reading of this review and for the frequent discussions of Professor Rhine's work which have helped greatly in evaluating many of the points at issue.

[2] The numbers within brackets refer to corresponding numbers in the list of references. Where two numbers are separated by a colon, the first one refers to the reference and the second one to the page of the reference.

don Society for Psychical Research also complains of Rhine's failure to describe his experiments clearly (27). Rhine's second book, *New Frontiers of the Mind,* has been chosen as the October 1937 Book-of-the-Month. Pleasantly written, it gives, on the whole, an exciting non-technical account of the work. It will doubtless prove popular and profitable.

Rhine's first book summarized nearly 100,000 trials in which he found a grand average of 7.1 right for each run of 25 calls (15: 162). The total number of trials is by now considerably greater than 100,000, but the results are about the same. Confirmatory evidence has been published by a number of other writers (3, 4, 12, 13, 14, 20, 22, 30, and 35). More than half of these reports were written by present or former members of the group at Duke University. Adams (1) and Smith (23), both from Duke, have reviewed the foreign experiments of Bender and Tyrrell respectively. Both conclude that these experiments would not in themselves constitute satisfactory evidence of extra-sensory perception, but that they gain evidential value from their agreement with Rhine's findings.[3]

Rhine's conclusions from all this work are a complete vindication of his pre-experimental faith (15: 25, 16: 57) in extra-sensory perception. He is thoroughly satisfied that there is no other possible explanation of the above-chance scores the subjects made.

Rhine's conclusions have not, however, been universally accepted. There have been some experiments with negative findings and there has been some criticism of Rhine's methods. The purpose of this review is to evaluate the available evidence and to summarize the criticisms. These criticisms are of sufficient importance that they have kept many psychologists from accepting Rhine's work at his own evaluation.

Baker (2), Cox (5), and Willoughby (32, 34) have published reports of studies of clairvoyance with negative findings. The only subject from the three groups to make a significantly high score did so in a series of 175 unwitnessed trials. Gundlach (7) found no

[3] The recently printed third issue of the Journal of Parapsychology contains some additional studies. In a study of 12 subjects involving some 12,000 trials, Kubis and Rouke found all scores well within the chance range. Rhine, Martin, and Pegram (one of Rhine's assistants) found results in agreement with Rhine's earlier reports.

evidence for telepathy in some 500 returns from an experiment conducted by radio. Presumably those who thought themselves best able to score significantly were those most likely to submit their records. In addition, I know of four other (unpublished) studies all conducted by competent psychologists who have reached negative conclusions.

Since Baker, Cox, and Willoughby are the only investigators who have published negative findings, Rhine presumably had them in mind when he wrote: "So far as I know only three have failed to confirm it, and those are the three series conducted with the least regard for the Duke procedure. They were not done under the direction of anyone with experience in this difficult field" (16: 143) and "without following our methods and without keeping in touch with us" (16: 107). But can the technique be so difficult? Rhine writes in the same book that "the procedure was simple" (16: 59), that "It is particularly suitable for student research since the techniques are not difficult" (16: 154), and that with a pack of cards and a mimeographed sheet of directions doctors, school teachers and ministers have been able to duplicate his results (16: 251-252). Only when psychologists trained in experimental methods fail to confirm Rhine's results is the technique called difficult.

Rhine has discussed several possible alternative explanations of his results. In turn he ruled out the possibility that they may be due to chance, fraud, incompetence, sensory perception and rational inference. Since some of the critics have not been so sure that these alternatives have really been ruled out, the various possibilities should be examined.

The Hypothesis of Chance.—Various criticisms of Rhine's conclusions have depended upon a misunderstanding of the nature of chance success. The most probable score can be shown analytically to be 5, as Rhine claims, and empirical chance series (4, 11, 29, 32, 34, 35) have all averaged about 5. Warner (29) has shown that long runs above an average of 5 do not occur by chance alone. Stuart (24, 25, 26) has answered Willoughby's contention (31, 33) that the chance distribution would be markedly skewed.

Some other criticisms of the statistical methods employed by Rhine are harder to dispose of. In using the binomial expansion $(\frac{1}{5}+\frac{4}{5})^n$ and tables of the normal probability integral as means of evaluating the differences between a given score and 5, the aver-

age score which would be obtained by chance alone, Rhine is making the assumption, whether he recognizes it or not, that the calls are entirely independent events. But his subjects all knew the nature of the deck and probably so distributed their calls as to approximate a 5:5:5:5:5 ratio. Since Rhine fails to present any actual records it is hard to tell what his subjects did, but Willoughby's analysis (32, 34) of his own subjects' calls showed that they approximated the known pattern and it may be assumed that Rhine's subjects did also. If they did, the calls were mutually interdependent events instead of being independent of each other. The distribution of hits made when the 25 calls are dependent upon each other differs from the distribution which would be found if they were actually independent. The mean is 5 in both cases, but high scores occur much more frequently and the standard deviation of the distribution is larger for the dependent series. Hence every anti-chance value quoted by Rhine is too large. The size of the error in evaluating a given score varies. By itself it is sometimes not great enough to alter the conclusions drawn from a given experiment. But, as Kellogg points out (10), the error becomes more important as the series of calls becomes longer. Kellogg (10), Wolfle (36), and Zubin (37) have discussed the statistical difficulties involved in analyzing Rhine's data and have suggested methods of overcoming those difficulties.

Rhine implies that such criticisms are worthless because they were made by psychologists and not by mathematicians (16: 121), and defends his treatment by saying "the mathematical theory has been tested many times" (15: 110). Rhine misses the point of the criticisms. The theories of probability are all right. It is the inappropriateness of his use of them that is criticized. Tests and approvals of the mathematics of probability are irrelevant unless the data are gathered in ways which meet with the assumptions underlying those theories. Rhine has, probably unwittingly, failed to comply with these assumptions.[4]

[4] Greenwood and Stuart, in the third issue of the Journal of Parapsychology, examine the mathematical techniques used in ESP research and conclude that Rhine's assumption "that each trial is independent of the others . . . . is violated when ESP cards are used in fixed packs of 25 each. But in practice the error introduced is so small as to be almost negligible in its effect upon an experimental conclusion" (pp. 209-212).

Kellogg (10) has criticized Rhine's selection of subjects, as assuming the existence of the abilities which he is trying to find. In many experiments it is necessary to use only those subjects who possess the ability under study. If extra-sensory perception is an ability possessed by only a part of the population, Rhine has a perfect right to select that part for study. But, having selected good subjects in pre-tests, the important question is: Does Rhine report *all* of the data gathered after the selection was made. Lemmon (11) decides in the affirmative and Rhine says: "Scientific ethics required us to count every test we ran" (16: 58). But he also says: "If, during the performance for record, the score drops below a 6 in 25, it is legitimate to quit scoring for a time" (15: 57). These two statements are not necessarily contradictory. Whether or not they are in fact I do not know. But this much is certain: Regardless of whether Rhine counted all of the low scores, he certainly discounted them. The subject was ill (15: 95-96), disturbed by a letter (16: 98), expecting to be married (15: 45), sleepy (15: 94), or, more generally, the ESP ability declined with a loss of interest in the work (16: 105).

An evaluation of the data on telepathy is made difficult by Rhine's failure to state exactly how each telepathic series was made up. The clearest statements are: "The choice of order of images was planned by the agent for each 5 trials, avoiding any naturally expected order" (15: 81). "After these five were used, another five would be mentally selected, usually some variation of the first five" (15: 116). It was probably true that each set of five images usually contained one of each of the five suits. That was the easiest way for the agent to make the total run of 25 consist of five of each of the five suits. Rhine has not stated definitely whether the telepathic series differed from the clairvoyant series in this respect. Kellogg has pointed out (10) that having each set of five contain one representative of each suit increases enormously the probability of getting more than five right per run. There are 120 permutations of five things, and, in each series of 25 there are 5 sets of 5 each, so the greatest possible number of different series is $(120)^5$ and many of these (repetitions and approximate repetitions throughout the five sets) will hardly ever be used since the sets were not made up by chance but by an agent who was using a "systematized scheme of variation" (15: 97). Thus the number

of different series in the telepathy experiments may have been less than 25 billion instead of the 298 quadrillion assumed by Rhine. If this was the case, the significance of the experiments on telepathy is decreased tremendously. For example, Rhine computes that the average score of 10.1 right per 25 obtained in the famous Junaluska series in which the agent and percipient were separated by a distance of 250 miles would occur only once in a billion or so times if chance alone was responsible. Correcting for various errors which he thinks were involved in this computation, Kellogg (10) computes that such an average would occur by chance alone once in 42 times.

The Hypothesis of Fraud.—Rhine does not believe that the results are due to fraud (15: 110-112). The foreword by William McDougall, the introduction by W. F. Prince, the main body of *Extra-sensory Perception* by Rhine, and the Book-of-the-Month Club News for September 1937 all contain testimonials to the honesty of Dr. Rhine and his subjects. None of Rhine's critics has published any charge of conscious dishonesty.

The Hypothesis of Incompetence.—Rhine concludes that "the Hypothesis of Incompetence will, I think, find few adherents and no justification" (15: 112). There has been relatively little outside observation of Rhine's work (it was observed by Wallace Lee, a professional magician, and by W. H. Wright, Chairman of the Department of English Literature of Columbia University) and Rhine is quite right in saying (16: 245-247) that it is more important to get confirmation of results from other laboratories than it is to have a committee observe him and his subjects. Rhine writes of his training that he at one time planned to enter the ministry, but that as graduate students he and his wife "turned by common consent to the field of professional forestry. The woods seemed to offer a free and natural life, one in which we might hope to escape the fog of an increasingly dubious philosophy and work out at least a practical formula for existence" (16: 53). A desire to enter the field of psychic research led the Rhines to work with Professor McDougall and to an appointment at Duke. Rhine is not a member of the American Psychological Association. Only three of the 18 authors whose articles have been cited above as evidence for ESP are members.

In the final analysis an investigator's competence must be judged on the basis of how carefully he sets up his experiments and how thoroughly he analyzes and reports them. How carefully Rhine's experiments were set up and analyzed can not be determined because he reports them so inadequately.

The Hypothesis of Sensory Perception.—Various methods have been used to keep the subjects from getting sensory cues from the cards which they were calling. As described, these methods would seem to be adequate, although Kellogg (10) has emphasized the fact that scoring is highest where the possibilities of sensory cues are greatest, and some experimenters have found that scores decrease with any increase in the strictness of the precautions against sensory cues. Pratt, for one example, writes: "sealing the cards in envelopes or having the subject 'read down through the deck' gave only chance results" (13: 13). If the image on the card is really perceived by extra-sensory means, it is hard to understand why increased rigor in guarding against sensory perception should diminish the scores.

If it should develop that the results obtained by Rhine and his co-workers are, in part at least, due to the sensory perception of minimal cues, the explanation would not be without a precedent, but neither would Rhine be without an answer. In an earlier study the Rhines satisfied themselves that Lady, a horse reputedly capable of "mind reading," was not responding to sensory cues and that "only the telepathic explanation . . . seems tenable" (18: 463). A year later they discovered that the horse was responding to sensory cues and "were forced to conclude that the telepathic ability we earlier found the horse to possess has been now almost if not entirely lost" (19: 291), and that Lady had substituted the use of sensory cues for the lost powers of telepathy.

The Hypothesis of Rational Inference.—If after each call or after each five calls the subjects are allowed to see the cards which they have called, they may infer rationally which suits are left in the deck in the greatest frequency and so increase their average score above 5. Willoughby (31) and Wolfle (36) have pointed out this source of error and have obtained average scores of 7 to 9 with the use of rational inference but without (consciously at least) using any extra-sensory powers. If Rhine also used these methods some of his above-chance scoring is easily accounted for. But did

he use them? The statements Rhine makes in *Extra-sensory Perception* are not all consistent. He writes that the BT-5 method (a check-up after each 5 cards) was: used (15: 54), used in about half of the trials with his chief subject, Pearce, (15: 73), recommended to future workers as the best technique (15: 168), used sometimes (15: 140), and used in only a small portion of the clairvoyance experiments (15: 115). On the basis of these conflicting statements Willoughby (31) and Wolfle (36), but not Lemmon (11), decided that a fair percentage of the data was gathered under the BT-5 conditions. But Stuart says these methods were used in only "2,850 trials of the 75,000 odd clairvoyant trials reported" (24: 385). Clear statements of conditions by Rhine would have saved a good deal of confusion.

But even when the BT-5 method was used, Rhine failed to see any error in it. He devotes some space to a defense of the method and contends that "Even theoretically, however, there could be an inference made only in case all of one suit had been checked out in the first 20 cards" (15: 115). In interesting contrast to Rhine's labored defense of BT-5 is Stuart's brief description of it as "this admittedly inadequate condition" (24: 385).

After describing and defending the BT-5 method in *Extra-sensory Perception* and recommending it to future workers as the best technique, Rhine denies in *New Frontiers of the Mind* (pp. 64 and 119) that he has used it.

Other Possible Explanations.—Are there other possible explanations of Rhine's data? Kellogg suggests one for the telepathy results. As described by Rhine, the agent made up an order of five images and then "keeping this symbol order dimly in mind, he would concentrate his attention on the first one and signal for the receiver, or percipient, to make a call. After the receiver had made his call and it had been recorded, then and only then would the sender make the record of his first symbol" (16: 162). Records of the receiver's calls were usually taken by the agent. Kellogg comments on this method: "Judge the effect on the scores of the almost inevitable tendency, especially in a laboratory so full of faith in ESP, to give the subject the benefit of the doubt in any trial involving some difficulty in hearing or in memory, and the great likelihood of illusions of hearing, the hearing of one call as a different one, especially when the observer gets excited in the course

of a good run, and so hears what is desired instead of what is really uttered, yet with not the slightest realization of the possibility of a mistake" (10: 340). In evaluating these speculations of Kellogg's it should be remembered that Rhine kept a noisy electric fan going to cover unconscious whispering (15: 106) and that Rhine says: "in large numbers of trials distance makes a significant advance in scores. The difference . . . . is of mathematically justified significance" (15: 106-107). With amusing logic we find Rhine contending that the telepathy scores, which "actually significantly increase with distance" (15: 107), cannot be due to mistakes and illusions because "the scores for this work with the agent and percipient in the same room are nearly as high as with the two separated" (17: 224). Rhine emphasizes or minimizes the actual difference depending upon what he wants at the moment to prove.

Carpenter and Phalen found another source of error due to having the subjects help in the recording. It seems to be customary to allow the subject who has just finished a series of 25 calls to help in checking them by calling off the actual card order to the recorder. Carpenter and Phalen noted that under these conditions the subject would sometimes "look both at the card and at the record-sheet and in so doing called once or twice when observing the symbol on the record-sheet rather than the card's symbol" (4: 39). If done unintentionally and only occasionally this kind of error could be discovered by checking the records of the card order to see that they were of the 5: 5: 5: 5: 5 type. But if done intentionally (I have no indication that it was) a dishonest subject could remember that he called "star" on, for example, the third card. Later, when helping to check the deck he could announce "star" for the third card and compensate for that whenever the next star actually appeared. Since it is easier to remember the first and last of a series, the greater number of hits which Rhine found in the first five and last five cards of the pack could be produced in this way.

The subjects were mostly paid an hourly wage for their work (16: 97). It is quite legitimate to motivate the subjects as highly as possible, but it is also legitimate to point out that in this case their continued employment seems to have depended upon their ability to continue to make high scores. May they not have been strongly

enough tempted to avail themselves of such experimental loop-holes as those pointed out by Kellogg and by Carpenter and Phalen? All in all it would seem safer to avoid such loop-holes by having the records of calls and of cards (or images) made separately by different recorders. Comparisons between the two would then be free from these sources of possible error.

Perhaps there are other errors as yet undiscovered. Perhaps even the results may all be due to an accumulation of experimental errors. But if this is so, it has not yet been proven. No one of the errors pointed out in this review, and probably not all of them combined, can explain all of Rhine's results. However, they all tend to produce better-than-chance scores or to increase the apparent significance of better-than-chance scores. Rhine's argument is materially weakened by these errors.

Rhine has convinced the popular magazine writers that his results are due to extra-sensory capacities and not to other factors, but he has not yet convinced any of the fairly large number of psychologists with whom I have discussed the problem. Nor will he until the amount of confirmation of results by trained investigators who are completely independent of the Duke laboratory becomes considerably greater than it now is. The amount of such confirmation actually in existence is hard to determine and likely to be exaggerated. Fadiman writes of "dozens of other groups working at widely separated points" (6); Kaempffert claims that there are "no fewer than forty investigators in universities" (8) and repeats that "about forty reputable Doctors of Philosophy" are engaged in work of the Rhine type (9). Scherman says that "about a score of other colleges and universities, in this country and abroad, have conducted similar experiments and in four cases out of five, have obtained similar results to Dr. Rhine's" (21). Where these reviewers found justification for their statements I do not know. Rhine himself is more modest. He says that there are some 50 *lay* investigations of which he is aware but which are not in print (16: 252). He refers to "at least a score" (16: 143) of other American universities and says that "a dozen of these . . . . confirm the basic principles of the Duke work" (16: 143). But he does not name the dozen or score of universities. He only cites (16: 143-154) work from Columbia University, Bard, Guilford, and Tarkio Colleges, and the grade school at Sarasota,

Florida. It still remains true that the majority of the confirmatory articles have been written by people at Duke University or by graduate students elsewhere who have since received fellowships at the Duke Laboratory of Parapsychology.

Rhine's reports have been characterized by too many unclear statements and too few actual records to allow an independent analysis of his data. Because of this fact, because the experimental methods used were too lacking in rigor, and because the independent confirmation of results has been too meager, many psychologists have quite properly hesitated to accept Rhine's work at his own evaluation. The burden of proof, the London Society for Psychical Research (27) to the contrary notwithstanding, is still on those who believe in telepathy and clairvoyance.

Since this review was written an extremely important error has been discovered by Dr. B. F. Skinner of the University of Minnesota department of psychology. Dr. Skinner writes me:

> I have examined two packs of ESP cards developed in the Parapsychology Laboratory at Duke University—one pack sent by Dr. Rhine to Dr. Kenneth H. Baker of the University of Minnesota, the other purchased at a bookstore in Minneapolis—and in both cases I have found it very easy to call all the suits correctly merely from examination of the surface of the backs of the cards. The cards have been warped slightly by the moisture in the ink with which the figures were printed and in each case the figure is clearly visible as a depression in the surface of the back. When facing a fairly strong light, there is no excuse for mis-calling any card in either of these decks. With a little practice, good scores may be made under much less favorable conditions, and the secret may easily be kept from observers.

I have checked Skinner's observation on several packs of cards purchased at different Chicago book stores and have found that under the usual BT or matching techniques used by Rhine and his collaborators I too can read the cards perfectly from the backs alone. Furthermore, the printing process has produced slight but perceptible ridges in the surfaces of the cards. A subject with a keen tactual discrimination could probably make use of these cues when a screened matching technique was used.

Many of the subjects have probably not realized that the sensory cues do exist. But it is not necessary that they should. A subject may get a vague feeling that a given card bears a certain symbol without recognizing the sensory source of his impression. It is

not necessary that the subjects be able to verbalize these cues in order to profit by them.

It seems almost impossible to suppose that the markings on the cards have escaped the attention of Rhine and his co-workers. It would be interesting to know why he has not published this information.

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COMMENTS ON DR. WOLFLE'S REVIEW.

By J. B. RHINE, M. S., Ph. D.,
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The critical reader expects, and I judge the editor expected, when he asked Dr. Wolfle for this review, a clear-cut summary of the sharply drawn issues of the research in extra-sensory perception and above all the evidence for and against those issues which enable us to make a decision on them.

The above review gives us the first but not the second. The issues are mostly outlined. The survey of the evidence is lacking. Instead of the evidence the reviewer freely expresses (or reveals obliquely) his own views and argues a great deal against acceptance of some minor parts of the early research, on grounds seldom explicitly stated and supported. The main research is considerably talked *against* but not *about*. It remains in the background.

But *actually, were* the results due to chance? To sensory cues? To rational inference? To incompetent or tricky handling of the scoring? We expect in such a review to learn the status of each question as it is today, to see marshalled the evidence of the best experimental conditions designed to meet the question. The job of the reviewer is rightly to hold up all the alternative hypotheses but at the same time to dig up and at least outline all the facts that bear on them.

It is not enough to say weakly at the end, as Dr. Wolfle does: "No one of the errors pointed out in this review, and probably not all of them combined, can explain all of Rhine's results." Even this concession is too much the reviewer's personal judgment. It is due the reader to be shown whether or not the available evidence substantiates or contradicts the different alternative hypotheses or is not adequate to do either. On a question so debatable as this there is no one whose mere judgment is enough.

Chance.—After summarizing the criticisms on chance, might we not have had something to enable us to decide the issue? Do the criticisms apply, and how damaging are they? Dr. Wolfle admits in a general way in the quoted remark above that chance is not an adequate explanation, but the reader is entitled to the facts.

Most of the space under this heading was given to criticisms made by Dr. C. E. Kellogg, and I shall not comment on them here since Mr. C. E. Stuart is writing a reply to Kellogg's more technical critical articles in the forthcoming *Journal of Abnormal and Social Psychology*. Furthermore, the main points of criticism are either

directly or incidentally dealt with in recent articles by other mathematicians.[1] And finally the issue raised by Kellogg is effectively closed by the following press release issued December 30, 1937, by the president of the Institute of Mathematical statistics, Professor Burton H. Camp:

"Dr. Rhine's investigations have two aspects; experimental and statistical. On the experimental side mathematicians of course have nothing so say. On the statistical side, however, recent mathematical work has established the fact that assuming that the experiments have been properly performed, the statistical analysis is essentially valid. If the Rhine investigation is to be fairly attacked it must be on other than mathematical grounds."

Sensory Cues.—This most important issue gets little attention in the review, half the space given it consisting of the gravest of implications without offering evidence to warrant it. Instead of ridicule, the reader may rightly expect the evidence for and against sensory cues. The reviewer might have stated the issue, laid down criteria of judgment—distance or screens between cards and subject; no handling of cards by subject, use of cards in sealed opaque envelopes, and the like. Then he could have summarized the evidence meeting those conditions If there is none that meets the criteria, then—and only then—he might conclude that the case was inadequate.

I have myself just published such a survey[2] made on the basis of the most strict criteria for the exclusion of all sensory cues. Meeting these criteria there are 145,125 trials made by 118 subjects under the supervision of ten different experimenters, with the critical ratio of 30. A deviation large enough to give this ratio would be expected to occur by chance alone about once in a number of times so large as to require two hundred digits to state. These are some of the facts to which the reader is entitled, quite as he has a full right to any facts adverse to the case.

[1] E. V. Huntington, "A Rating Table for Card-Matching Experiments," Journal of Parapsychology, I, 4, 292. T. E. Sterne, "The Solution of a Problem in Probability," Science; November 26, 1937, p. 500. T. N. E. Greville, "The Exact Hit-Frequency Distribution in Matching Two ESP Decks," in manuscript. Greenwood and Stuart, "Mathematical Techniques Used in ESP Research," Journal of Parapsychology, I, 3, 206. Stuart and Greenwood, "A Review of Criticisms of the Mathematical Evaluation or ESP Data," *ibid.*, I, 4, 295.

[2] Journal of Parapsychology, I, 4.

Rational Inference.—Was BT-5 all Dr. Wolfle could find bearing on this question? Why did Dr. Wolfle not give his readers a chance to consider some of the unimpeachable conditions: The Pearce-Pratt long distance series, or the MacFarland and George screened series with cards left untouched till the end of the run, or the work with both screened and sealed cards called by blind subjects conducted by Price and Pegram, in deciding whether the subjects' reasoning could help him? Doubtless he saw no way in which rational inference could explain these series, and their omission is equal to a recognition of this fact.

It is not our mistakes, but our successes that must be judged in order to decide whether ESP is a reality or an error. It might well be granted freely that the BT-5 could be written off the books as worthless without affecting the case for ESP. But it can be seen in the curve on page 137 of my monograph [3] that rational inference is entirely inapplicable even to BT-5, since the last call of the pack is the lowest instead of the highest, as that hypothesis would require. For that matter, shuffling after each five, which is necessary to prevent rational inference, was generally practiced. And the figures for Pearce's total BT-5 *are* given on page 136. Dr. Wolfle overlooked them. But the BT-5 method has long since been discarded (because it is slow) as all know who follow the literature on the subject of ESP.

Incompetence.—In discussing the competence of others the reviewer in his first statement makes a serious error. He states, "There has been relatively little outside observation of Rhine's work." And he names two witnesses. On page 76 in table and footnote there were given several, four of them psychologists.

Again, in describing my training he tells only of my early interest in the ministry and later in forestry. That is the extent of my training, so far as the review goes! As a final mark of my incompetence, it is said I am not a member of the American Psychological Association.

One may pass over with tolerance the often cleverly gerrymandered citations that convey amazingly uncomplimentary implications; but the absence of a straightforward dealing with the whole evidence on its merits, the omission of the great blocks of data that have been gathered to help solve these questions—this is, so

[3] Extra-Sensory Perception. Boston: Bruce Humphries, 1934.

far as the research is of concern to the reader, a grave and intellectually dubious matter.

But it should be granted also that even a misrepesenting review has its value. As stated above, Dr. Wolfle has outlined the issues. It is regrettable that he did not do as well with the facts.

I am grateful to him and to the editor, Dr Farrar, for this opportunity to comment.

* * * *

It is true, as Dr. Wolfle points out, our efforts at commercial reproduction of the ESP cards have not been fully successful, although much care and attention have been spent on this seemingly simple but actually complicated problem.

The earlier ESP work was done with hand-stamped cards prepared in the laboratory. "The cards were cut from white heavy cardboard which was opaque to light from a 100-Watt light bulb. The figures were stamped in fountain pen ink with rubber stamps which left no detectable warping or other tactual stimuli." [4]

But even though we felt confident that sensory cues from the cards used were not possible, we withheld all publication until the work with distance and walls between the subject and the cards was conducted and placed the matter beyond the risk of controversy over sensory cues. During the year 1937 a great deal of further research [5] is reported by others in which screens, distance and opaque envelopes prevent sensory cues from playing a conceivable rôle, even if the cards were defective. No research to date has yet been reported in which the new commercial cards were used.

In the December number of the *Journal of Parapsychology,* the first issue to follow the publication of the new cards, the following statement was made:

> Imperfections in the commercial reproduction of the ESP cards preclude their unscreened use for experimental purposes. As reports of screened work have indicated that subjects do practically as well and in some cases better when they have no sensory contact at all with the cards, the screen should be so uniform a condition that card imperfections are not a matter for experimental concern. However, the publishers of the cards have been able to overcome the principal difficulties and future printings will therefore be much improved.

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[4] "Some Basic Experiments in Extra-Sensory Perception: A Background." J. B. Rhine, Journal of Parapsychology, I, 1, 1937, p. 72.

[5] See "The Question of Sensory Cues and the Evidence," J. B. Rhine, Journal of Parapsychology, I, 4, 1937.

NEUROSES AND NEUROPSYCHOSES.

Illustrative Case Histories.*

By ABRAHAM MYERSON, M. D., Boston, Mass.

In a previous paper † I sketched at some length what I regard as the symptom structure of the neuroses, namely the individual symptom groups, and their combination into various types and forms. From this was built up the concept of the neuropsychoses as the final development of certain symptom trends. For example, at a final stage in the evolution of a neuroses, the feeling of unreality may pass over into that falsification of reality which we label delusion. Hypochondriacal fear, such as the common one of heart disease, may evolve by quantitative increase into the feeling that the heart is literally gone, or actually broken. In this case, fear and anxiety have developed into delusion. Another example may be cited; in groping for the cause of his illness, a sufferer may conclude that he is sick because he has violated the rules, as he understands them, of health. Later on, as he becomes hopeless concerning his recovery, he may deny that he is ill and state that his sins have found him out or even that he is being punished by God.

The reader is referred to this previous article for the detailed discussion of the symptom groups. Briefly summarized, in the course of that departure from normal physiological and psychological functioning which is seen in neurosis, abnormal fatigue or the very common " I am so tired " group of symptoms appear, in which a feeling of lowered energy or of spasmodic discharge of energy occurs. This has the important peculiarity that the fatigue is usually greatest in the morning and through the early part of the day, and tends to become lessened as the day wears along. In mild form this is hardly a disease. In more severe form, it becomes associated

* From the Division of Psychiatric Research, Boston State Hospital, Boston, Mass., aided by grants from the Commonwealth of Massachusetts and the Rockefeller Foundation.

† Neuroses and neuropsychoses. The relationship of symptom groups. Am. J. Psychiat., 93, 2: 263-301, Sept. 1936.

with certain signs which differentiate it from normal fatigue, in that restlessness tends to take the place of that seeking-for-rest which characterizes normal or physiologic fatigue. *The rest-recuperation mechanism becomes disturbed,* and the capacity to relax and to feel rested and fresh may entirely disappear. At the same time an over-reaction to stimulation takes place. The body becomes agog and it reacts to the stimuli of the outer world as if the threshold of normal inertia had disappeared. Meeting one's fellowmen, undertaking the normal activities, whether of play or of work of any kind, become ordeals in which the functions of the organism become disturbed and, what is more important, tend to become conscious, so that the individual becomes obsessively and anxiously aware of his heart, his head, his feet, his sexual organs. . . . . Thus, the gastro-intestinal tract obtrudes itself into consciousness. In this way, emotional disturbances, fatigue and frustration pass into neurosis and by this type of mechanism, trouble becomes illness. The body lacks the protective buffer of inertia. The attention becomes shifted from the external world to the seething world within; thus arises anxiety (a reversal of the opinion usually held). In this way, anxiety may become as extensive as all experience (panphobia), or it may relate itself to certain situations (agoraphobia, anthrophobia, etc.). Thus, there appears the diffuse anxiety neurosis, or through the medium of the association of ideas, situation-bodily responses (church anxiety, crowd anxiety), the focal phobia. In the severer cases, the individual has to force himself into activity, and this lack of spontaneity appears in all his reactions and feelings.

There is conspicuously present, in greater or lesser degree, another group of symptoms which I call the anhedonic group or, more briefly, *anhedonia.* In anhedonia, there is usually a sense of fatigue, although in the extreme cases this disappears and is merged into a numbness and a psychic anesthesia in which even fatigue does not appear. The appetite or desire for food, drink, sex, social relationships, and for those diversions and entertainments by which man seeks relief from the onerousness of his life and his dissatisfaction with his restrictions, becomes impaired, distorted or disappears. Coupled with this lack of desire is a haunting lack of satisfaction. Sooner or later, and in greater or lesser measure, the

feeling of unreality appears. The outer world loses its meaning as life in general does. Obsessiveness takes place. A whirligig of never-ending, pseudo-philosophic inquiry into the "how" and "why" of everything torments the patient, as he seeks to re-establish the feeling of certainty. As desire, satisfaction, value and certainty disappear, reality in the sense of vividness and personal value of experience becomes dream-like, and the consequent unreality may become falsified into delusion.

In this paper, I intend to cite cases in which the individual has, at certain stages of his illness or at different periods of his life, a neurosis. In the course of his life-time, the symptoms of his disorder become so intensified that, for example, the anxiety state finally becomes an involutional melancholia. Not only does this happen over a considerable period of time, but even during one and the same day, the patient may become agitated and deluded in the morning; and later on, during the day, corresponding to a common cycle of the neuroses, he may become so improved as to feel even entirely well or, at the most, to be suffering from a mild neurosis. This swing of symptoms from psychosis to neurosis, and back again, may take place regularly day after day. Even in the formidable conglomeration of conditions known as schizophrenia, the evolution from neurosis is not uncommon. The transition from the neurotic statement, "I am sick" to the delusion "I am sick because others are persecuting and injuring me by electricity, X-ray, hypnotism or wireless" can be clearly traced. Quite frequently, the phenomenon of retreat from the disturbance which takes place in almost all illness and which is especially common in the neuroses may bring about a schizoid state which is probably not true dementia præcox, but closely resembles it in many of the presenting symptoms.

CASE HISTORIES.

CASE 1.—A housewife of 65. The family history is not relevant. The first attack came at the age of 23 after her first baby was born when, she states, she saw everything "blurred" for several months, was very restless, had queer and disturbing sensations in her throat and abdomen. The blurred vision disappeared, but the restlessness and the disordered sensation in her throat and abdomen have remained almost constant from that time to this, so that she has never felt fully vigorous or well. Seventeen years ago she had an operation on the reproductive organs (partial hysterectomy). Nineteen

years ago she had a bad accident, as a result of which she broke her thigh and has been lame ever since. The condition from which she has suffered almost chronically for 40 years has been diagnosed as gastric neurosis and general neurasthenia by many competent men. There have been many examinations made, including X-ray, metabolism and all types of clinical studies, none of which has revealed organically significant disease.

On March 30, 1910, she was committed to the Danvers State Hospital. Their records indicate that there were many difficulties in the diagnosis of her case. They confirm the statement that she has been nervous for a long time and had four definite attacks of mental depression. These attacks were characterized by ill-defined feelings of fear (although during her latter attacks there were certain definite phobias), agitation and depression, in which state the patient gave vent to her feelings in a loud, uncontrollable manner. At no time did she show retardation of thought and during the later attacks she had quiet, cheerful days interspersed with those of deep depression and agitation. . . . . "During the past nine months she has not been normal at any time, with the most marked signs of aberration noticeable at the time of the menstrual flow. Since January the patient has been worse, has been clouded a great deal of the time with, however, clear days. She has been in a state allied to frenzy in which she has made definite suicidal attempts. During the past two months very active auditory and visual hallucinations have been present. . . . . There are many features which suggest hysteria. First of all is the natural disposition of the patient; fears of nervousness associated with terrible sensations in the head, along the spine, etc., and in addition, the sudden marked display of emotional feelings and the changeability of these . . . . The lack of stigmata, extreme degree of clouding and active hallucinosis, however, are contrary to true hysteria. The fainting spells which the patient has recently had with possible loss of consciousness, the period of confusion following these, and finally the frenzied state from which the patient is now clearing up, suggest strongly epilepsy. We are, however, unable to obtain a history of epileptic seizures. In consideration of the above facts, the diagnosis of hystero-epilepsy is preferred, the disease taking on many of the characteristics of each condition. . . . . The fact that the depression is not constant, the hallucinations so pronounced, and the clouding so severe, serve to rule out the diagnosis of manic-depressive insanity which is the only other condition to be considered."

Following this attack she had an almost continual neurosis, by which is meant she experienced extreme fatigue, was disturbed in sleep and appetite, had paresthesiæ through her body, especially in the throat and head, was extremely hypochondriacal, and a large part of the household expenses concerned her visits to doctors and hospitals.

When first seen personally on April 7, 1933, her main complaint was a queer sensation in the throat and abdomen which made it difficult for her to eat. These queer sensations at that time entirely occupied her attention. She was conscious of the rapid beating of her heart; her mouth felt dry; her sleep was disturbed; and her general vigor much diminished. She was markedly hypochondriacal and quite restless. At that time the diagnosis was

chronic neurosis, anxiety type. She was under treatment during 1933 and improved considerably, but never became really well. While much more comfortable, she was still the typical neurotic invalid, guarding herself carefully, watching her diet, regulating her bowels by diet and medicine, and quick to take alarm at any pain or ache. There were times in which her body became alive with disturbing sensations, for which she visited hospitals and doctors. This was her condition until 1936, when the illness rapidly changed its character. She became markedly agitated, completely hopeless, and could not "make up her mind about anything." She became intensely hypochondriacal, seeing many doctors about her condition. (This is the stage of paresthesiæ and hypochondriasis.) She then became confused, felt that her whole family was going to be poisoned and that she was being poisoned. (Paresthesiæ are now delusionally interpreted.)

She was committed to the McLean Hospital, where she stayed from January 10 to March 9. She stayed in bed and at one time became so agitated that she had to be forcibly restrained in bed. The hypochondriacal complaints were still present, but had been transformed into delusions. Thus, she stated there was a real lump on her right side; her mouth was glued together; she could not see; her rectum was broken at three different places, causing her stomach to drop. Other delusions were present but these were transformations of anxiety into mild persecution. Other people were causing her to suffer . . . . Three months after entrance, she had entirely recovered so far as the psychosis was concerned. The hospital record states, however, that she was inclined to "emphasize her physical condition," that is, she was still hypochondriacal. She still felt sick, but delusion in the technical sense had disappeared. When she left the hospital on visit, March 9, she was decidedly better. The psychotic stage had passed, but the neurosis never disappeared and soon became marked.

Six months later she returned to my care and has reported regularly ever since. The symptoms of her case are again those of a neurasthenic neurosis. There is, first of all, markedly lowered energy. There is also a conspicuous and marked increase of reaction to outward stimulation, with complaints of paresthesiæ in the head, in the abdomen, in the legs and arms, and at times everywhere. These paresthesiæ are correctly interpreted as "nervousness," and she is aware of the fact that her former ideas were delusions. Her appetite for food, sleep, rest and social contact are markedly impaired. There is a slight sense of unreality, but not to the point where any falsification of reality takes place. In short, she seethes with paresthesiæ and anxiety which, however, keep well within the borders of neurosis.

At the present writing she is much improved. She still complains of pains, aches, disturbed sleep, poor appetite and a general feeling of malaise, but she is relatively cheerful, looks after her household duties in a partial way and has resumed the least fatiguing and the least onerous of her social responsibilities. I believe that this is in part due to the judicious use of sedatives at night and of stimulation, especially of benzedrine sulfate, in the morning.

Summary.—From her twenty-first year this woman suffered from a chronic neurosis of not unusual type. On two definite occasions her symptoms have deepened into psychosis; anxiety has become uncontrolled agitation; paresthesiæ and hypochondriasis have become delusion; and the limited self-control of the neurosis has become so impaired as to require social restraint and legal intervention. The transition from neurosis to psychosis and back again to neurosis has not, however, involved any new symptom groups.

CASE 2.—Male of 25, single. Family history is negative so far as the parents are concerned. One brother (case to be detailed later) is psychotic and at the Danvers State Hospital. Another brother (case to be detailed later) has a severe neurosis. The patient was first seen on February 10, 1936. Tha past history showed a happy-go-lucky, active person with the usual amount of social drive and interests, and a moderate amount of schooling. He was a store clerk in his father's small business and, according to whatever could be learned about him, got along well both with the outside world and with himself. His sexual life was active both socially and physically. Three years before being seen, he developed gonorrhea for which he was successfully treated, but this experience kept him from actual sexual intercourse, although he participated in a good deal of what is colloquially termed "heavy petting." In the latter part of 1935 he commenced to have as the presenting and most important symptom a burning sensation in his abdomen. Together with this, he became fatigued easily, slept poorly, lost his appetite and became intensely worried about himself. As a result of medical consultation, he was operated for an appendix after three months of medical care. He did not improve, however, insofar as his abdominal symptoms were concerned and, as a matter of fact, these symptoms increased.

At the time he presented the classical picture of a severe neurosis of anxiety type. There was marked loss of appetite, disturbance in the feeling of energy which was greatest in the morning, loss of sleep with no capacity to rest or recuperate, and marked paresthesiæ especially concerned with the abdomen and the heart. Under exertion and excitement his heart pounded so that he developed a set of hypochondriacal fears relating to the heart and to the gastrointestinal tract. In other words, there was increased reaction to excitement and hypochondriasis. He stated at this time that there was a great increase in his sensitivity to sights, sounds and odors. There also developed a sense of unreality, so that nobody looked quite real, and even such things as pictures hanging on the wall seemed to him to be unintelligible, in that their meaning no longer gripped him.

At this stage he commenced to develop a "psychosis." He felt he could smell the breath of other people and, finally, he believed there was a smell coming from him, and that this odor which came from his mouth created disorder all around him. He believed that this odor caused cats and dogs to bark

and fight with one another, and that it made his brothers, sisters and family generally sick. He completely retreated from social contact on this ground.

He was admitted to the Boston Psychopathic Hospital on March 6, 1936. The hospital record abstracted is as follows: "He carries out simple commands and does what he is told in a fairly intelligent and cooperative way. There is no over-activity, grimacing or unusual postures. The stream of talk is limited. He answers questions in a short and abbreviated way, requiring urging. He is apathetic, listless and uninterested. At the same time there is a general atmosphere of apprehension and uneasiness about the patient's whole appearance. He is preoccupied and inwardly disturbed during the course of the examination. Misinterpretations and delusions: the patient believes that animals on the street—cats, dogs and horses—take offense at him, and that when he is in the presence of other people they must cough and sneeze. He is definitely deluded in this general direction. There are no further misinterpretations and delusions. Patient is oriented to time and place; memory is intact but his knowledge of what goes on in his family is sadly limited. He handles serial 7's correctly but slowly. Judgment is diminished and he does not have much insight into his condition. Physical examination including the usual laboratory tests is negative, except that the blood pressure is somewhat increased, 145/90. Diagnosis is probably schizophrenia. Final diagnosis—dementia præcox, paranoid. Discharged unimproved."

As a matter of fact, the patient did improve. The delusions disappeared. He no longer believed that there was an odor coming from him, or that cats, dogs, etc., were affected by his presence. There was a very marked unreality feeling, however. He stated that he has to reason himself into the idea that things are what they were before, and that his impressions and perceptions have an alien or an unreal component which he cannot describe. He gives a very interesting account of the state of his bodily sensations. He states that everything in his body is exaggerated. A sight, a sound or an odor has a painful component, so that his whole body seems to react to whatever he experiences. There is, with this, a sense of choking and he feels, as he states, as if he were in another world. In addition, there is an associated anhedonia of marked degree relating to food, rest, sex, social life and, in general, work activity. He has to force himself to do anything. There is a complete lack of the spontaneous flow of activity. As he puts it, it seems as if he has to start everything by an act of will, and nothing is done without reflection and effort. He has the usual facility for vivid expression which is present in the neuroses. He wants to talk of his symptoms, and it is with difficulty that his attention is directed towards other matters. He is eagerly seeking help.

During the year he has been under treatment, there has been no fundamental improvement. Neither has there been a retrogression. X-ray studies of the gastrointestinal tract show a spastic state of moderate type and, although this has been relieved, there is no change in his general reactions.

The younger brother of the patient is now at the Danvers State Hospital. An abstract of their record follows: "Patient 23 years of age, of high school education, has worked but is not a good worker. He has been to CCC Camps

on two occasions, the last time in November of 1935 when he returned after three weeks, because he found the camp monotonous and lonesome. According to the history given by a relative, the boy has always been shy, did not have many friends, was slow and a day-dreamer. He was moody, worried and unhappy. It is said he was self-conscious and had feelings of inferiority. He was always analyzing his feelings. The patient was depressed for the past five or six years, felt that something was wrong with him, *read many books and pamphlets on health.* For two or three months he has been apprehensive and fearful, has had difficulty in thinking; memory was poor. Two months ago he went to the Massachusetts General Hospital and the family was advised to bring him to Danvers."

At Danvers "the patient has been *complaining of constipation constantly.* He felt the poison from his intestinal tract was entering his blood stream and making him weak, affecting his heart, changing his blood and influencing his thinking capacity. At first he was very much afraid of the other patients. He was given mineral oil to the point of diarrhœa, and ordinary enemas, colonic irrigation, but still maintained he was constipated. He has nothing to do with the other patients of the ward, is constantly merged in his own thoughts. The staff diagnosis was dementia præcox, type undetermined."

I think it can safely be said that whatever the diagnosis, the patient has passed from hypochondriasis, with the fear of ill health as the outstanding symptom complex, into somatic delusion which marks the transition between a neurosis and what is called a psychosis. No new feature has, I think, been added. The difference is merely one of degree rather than of kind.

The older brother of the patient, who is in a certain sense the mainstay of the family, complains of great fatigue when he arises in the morning and a feeling of restlessness which lasts the larger part of the day. He has marked anxiety when he has to meet strangers or enter into any new relationship. This anxiety is associated with the feeling of suffocation, rapid heart beat and disturbance throughout his organism (the agog stage of the neurosis). There is hypochondriasis which comes and goes. While he is much better, he states, than he was in the past, he is never entirely free from a certain amount of fatigue, fear and over-reaction to stimulation.

If we arrange the three cases, we may state that the first individual, the older brother, has never passed beyond the stage of a neurosis. The second brother, with whom this case history is mainly concerned, passed from a severe neurosis into a psychosis which was diagnosed as dementia præcox, but which was fundamentally anxiety, paresthesiæ, anhedonia and unreality into a psychosis of schizoid type, and has returned or improved to the point where he still has a marked neurosis which would need but little increase to "push" him over into a psychosis. The third case, the youngest brother, has a long history of hypochondriasis and from the diagnostic criteria, this history is that of a severe neurosis. He has passed into a stage of somatic delusion and retreat which is classed as dementia præcox in the institution to which he has been committed, but which I believe is more logically to be regarded as a *neuropsychosis,* that is, the neurosis has become intensified

to the point of lost insight, lost capacity for adaptation to the free world, and consequently to the stage of committability. Nothing really new has appeared in this transition.

Summary.—A young man, who passed through a stage of hypochondriasis with marked disturbance of energy, severe paresthesiæ, introversion and disturbed visceral function in general, enters into a psychosis which was diagnosed as dementia præcox, and then improves sufficiently so that his delusions and hallucinations disappear but he remains with a severe neurosis.

CASE 3.—A merchant, 48 years of age, married, has three children. Family history: A brother, somewhat younger than the patient was under my care during two definite cycles of manic-depressive psychosis. The normal temperament of this brother was somewhat hypomanic; he was very energetic and cheerful and the busy social type. His first depression lasted six months and was followed by manic excitement with grandiose ideas which lasted two months, after which he recovered and was entirely well for five years. Then there gradually developed a depression with retardation, loss of appetite, sleep and energy; marked self-accusation and hopelessness. This was succeeded by a short manic attack. In the course of this phase pneumonia developed and he died.

An older sister was also personally examined in 1920 and was under my care over a period of a year, at which time she presented a marked obsessive anxiety state. She had a great fear of infection and went through the obsessive rituals characteristic of this condition, washing her hands interminably, surrounding every act with a series of precautions which precluded any organized activity. At the same time, she was markedly sleepless; had no appetite for food, water, sexual and social relations; felt energyless; and complained of paresthesiæ throughout the body. This condition persisted for over a year and gradually improved to the point where she was able to carry on her household duties again.

The patient himself was first seen on January 9, 1928. He has always been of a depressed and somewhat pessimistic nature, quite penurious, but a very capable business man, who acted as a balance wheel of conservatism to his brothers who were his business partners. In 1928 he began to foresee disaster in his business, and this foresight was justified by the situation which developed, although his brothers scoffed at his pessimism. A state of anxiety, depression and sleeplessness evolved, and he gradually retreated from all contact with others, became markedly retarded, insisted that he and his brothers were completely ruined, and that his family would be thrown on the street; that the law would prosecute them for their misdeeds, etc., in the way characteristic of the depressed phase of manic-depressive psychosis. At no time were there hallucinations. He had to be fed and continually threatened suicide. The family was unwilling to send him to an institution, and he has been under care at home ever since.

During the early period of the development of his psychosis, there was picking of the face and other parts of the body, so characteristic of the anxiety phase of manic-depressive psychosis; he became quite scarred and at times the face was infected. In the last part of 1928 and the early part of 1929 he started to improve.

The development of his symptoms followed the course which I now outline: By 1931 he had passed imperceptibly from what is here termed the psychosis phase of his illness into what can only be classified as a neurosis. He was unable to work, disliked meeting people, but had no delusions concerning others or himself. He passed from the stage where he stated that he was not sick to the stage where he felt that he had heart disease, and in fact this was diagnosed in his case. He now complained of pounding in his head, pains around his heart, numb feelings in his hands and legs, complete exhaustion, over-reaction to excitement, and the loss of desire for all activity. He was completely accessible, quite friendly to his physician and followed eagerly instructions with the engrossed attention to detail so characteristic of the neuroses.

On November 27, 1931, my record states that the case had simmered down to a chronic psychoneurosis. He has been seen regularly since that time. At times he has been well enough to go to his place of business three days a week, but he finds the excitement and tension there too difficult to tolerate. He spends part of each week in a sanitarium where he receives baths, massage and general physiotherapy. These measures cheer him up somewhat, and he feels better for a day or two, and then lapses into a state of chronic complaint, is listless, moderately depressed, very hypochondriacal. During a recent trip to Florida, he felt quite well.

There has been a persistent strain in his household. In order to preserve her own health, his wife has made up her mind that she will give him no special attention. His son has taken over his business completely and consults him rather infrequently. His daughter has married badly in the sense that her husband is not able to support himself adequately. The change in Florida, especially the freedom from the daily annoyances and irritations of the home brought him to a state of relative normality, despite which he was unable to exert himself in a continuous manner without experiencing fatigue. On his return from Florida in March, 1937, the headaches, sleeplessness, pounding sensations around the heart, pains throughout the body and especially the hands and legs reappeared. He is quite willing to admit that he feels much more cheerful, but he still shows the anxiety characteristic of the hypochondriacal patient. From time to time he requires sedatives for sleep. Stimulation in the morning, especially benzedrine sulfate, gives him a few good hours during the early part of the day. At night he is ready to go to bed at 8 o'clock.

Summary.—In this instance, we deal with a man whose family history is both that of manic-depressive psychosis and anxiety neurosis, and whose normal temperament is that of the shut-in, depressed type. There developed the typical depressed phase of

manic-depressive psychosis. Like most of the cases of this condition, there has appeared no true manic state. In the recovery process, this patient has passed imperceptibly from the stage of psychosis into that of neurosis and for at least six years has remained in this condition. The symptoms vary somewhat in intensity. There are periods of moderate improvement. There has never been anything like recovery. The present state is that of a severe neurasthenia with hypochondriacal ideas and paresthesiæ, lowered energy, moderate anhedonia and substantial incapacity.

CASE 4.—A 36-year-old attorney, single. He is a man of fine physique, attractive face, is intelligent and especially quite adequate in the use of words. He was first seen on July 22, 1936. Family history negative. From his earliest days, he has had marked phobias and especially fear of injury, so that he was afraid to play the rough games of other boys. When he was about ten, he learned about germs and for several years he took unusual precautions, based on extreme fear, against infection, was greatly worried if he cut himself or if in any way he was exposed to disease. When he was 18 or 19, he commenced his heterosexual career, but soon became obsessed with the fear of syphilis and went through a ritual of precaution before and after relationships which was so extensive as to preclude sexual intercourse except on rare occasions. If he saw an individual who had a sore of any kind, this would suggest syphilis to him, and he would avoid contact by as effective a sort of quarantine as possible. From time to time these fears would vanish or become quite attenuated.

When he was about 27, there was a period in which he was very much depressed, felt greatly fatigued, could not sleep or eat. In fact, he says he was quite anhedonic. There was a marked feeling of incapacity. He carried on his work, although with great inner resistance and a spontaneous lack of interest and feeling. This passed away. He was in fairly good health, although he was irritable, moderately depressed, and lacked what he termed the normal feeling of energy and spontaneous desire to participate in social activities. He was quite successful in his profession despite all these handicaps.

On March 23, 1936, the patient was struck over the head in a riot. His skull was fractured; he had an extradural and subdural hemorrhage, involving the right side. He did remarkably well, however, and at the end of six weeks he was discharged from the hospital. There were absolutely no neurological residuals of any kind. He complained of slight headache and some tenderness but even these post-traumatic symptoms were inconspicuous in his case.

The mental state which developed was a very interesting and disabling symptom-complex. When people, especially doctors, met him the first few days after he returned to his occupation and to social relationships, their remark was—"You're lucky to be alive"; and one man unfortunately stated, "You've no right to recover from this; by all logic you should be dead." There developed the delusion that he had been dead; that he had come back

from the dead. He believed there must have been a physical death and in some mysterious way he had returned. From this there developed the semi-grandiose idea that he had the secret of life; what that secret is it was impossible to learn from him in any concrete or coherent terms, although he was completely coherent and relevant in everything else. There was some idea of a cosmic consciousness of which we are all a part; that the cosmic consciousness in some way flowed back into him and brought back life. With this semi-grandiose idea there was, however, the very depressed feeling that he is never going to have any peace and probably will never die. He states that he has visions of falling under water for eternity or whirling through space for eons of time. These visions, which are not hallucinatory but which are mental, indicate that he cannot die; that he will be exposed to situations for which death would be a relief, but he will be unable to find that haven of rest which everyone else experiences in death. This is a sort of punishment for having died and come back to life, for having transcended nature. Who is punishing him, he does not know. There is a sort of vague God in his religion by which Nature is personified and yet is not a person. There is a vague, mysterious, awful Power, whom he has offended.

Accompanying all these delusions was a marked anhedonia. He had little appetite for food, no appetite for sleep, and was completely without sexual desire. What social relationships he had were forced on him. He has no feeling of energy, and is especially disorganized in the morning. Towards night there is definite improvement. He has a sense of unreality, as if things were either out of focus or too sharply focussed. He cannot quite get the feeling of "what is real and what is unreal."

He manages to conceal his delusions and carries on the practice of law. Only his friends and his physician know about his state of mind.

By September 3, 1936, there was less obsessiveness or at least less feeling of impelling reality about his delusions. He was willing to admit that possibly he was mistaken. It was explained to him on many occasions that the trauma had expended its force external to his brain; that the brain had suffered no real injury; that his recovery was not at all mysterious but could be attributed to the efficiency of modern surgery. During the periods of discussion, he would be quite willing to accept this explanation, but each morning the depressing delusions would return; the belief that he would be glad to die but could never reach death would come back in full force. At the same time and running through what may be called the neurotic cycle, there was no appetite, great fatigue, disorganizing paresthetic sensations in the throat and body, all of which gradually wore off as the day went on. During the recovery process the morning symptoms remained much longer than did the afternoon and evening disabilities; in other words, the evening would find him fairly well recovered. The morning would see the inception of the pathological cycle but in lesser degree as time went on. Finally, he recovered and at the present time is substantially well.

Summary.—This case illustrates the transition from an obsessive type of neurosis, marked by phobias and other characteristic

signs into a delusional state of unusual character following physical injury. Of great interest is the fact that the delusions were associated with an anhedonia and that both delusions and anhedonia were greatest in the morning, tending to disappear towards evening. Likewise, the pathological symptoms persisted in the morning after they had entirely disappeared during the afternoon and evening. Thus, this patient was definitely psychotic in the morning and definitely non-psychotic in the afternoon and evening.

CASE 5.—A housewife of 49. She was first seen on February 4, 1936. Family history said to be negative. There is a history of "nervous breakdown" at the ages of 28 and 36. These were short attacks, characterized by depression, marked fatigue, marked impairment of appetite and sleep, considerable visceral distress, such as belching and nausea, the feeling as if her heart were pounding, etc. There was no sense of unreality, no delusion formation, no loss of insight. There was good social contact at all times. In the interim between attacks she was quite well, her temperament generally being actively and genially social. She was vigorous and devoted to her family, which consisted of her husband and one son. For about two years before the onset of her illness there was a great deal of economic strain in the household which finally reached the point of moderate social disaster, by which is meant that the couple lost their home and that there was a marked reduction of income.

The present illness started in September of 1935 after an incident which may have been of precipitating importance. A man, whom she knew when she was unmarried, met her accidentally and invited her to dinner. There were a few cocktails; she became moderately intoxicated and sexual relations probably took place. From that time on until her next period, she was in a state of great anxiety, agitation and self-accusation. The menstrual period came, however, without incident. Her husband took a remarkably tolerant and sympathetic attitude, despite which she passed rapidly into a marked depression. This depression at first was associated with severe somatic responses to excitement, such as nausea, vomiting, frequent micturition and a sense that her heart was pounding. This rapidly passed on to the stage where she felt dead, listless and, finally, to the point where she declared she was "dead."

She was committed to an institution on November 1, 1935. The hospital record states: "Facial expression is usually one of worried anxiety. At times when she forgets herself and her attention becomes distracted by external things she gets an expression of interest, but this quickly reverts back to the anxiety. As she discusses her ideas she gradually reverts to the anxiety and works herself into a very perturbed state. She is oriented for place and person and approximately for time. Judgment is normal on matters which do not concern herself but on all questions relating to herself, her judgment is biased by her emotional depression and by the somatic delusion that her brain is gone. Emotional tone is one of anxiety and agitation. She believes

that her mind is dead and that she cannot remember anything. In a whining tone of voice she will attempt to explain that there is nothing that can be done for a mind that is dead. There are apparently very definite feelings of unreality and these feelings worry her a great deal. She will say, 'I can say Milton but no image comes to me of Milton. I can't see him. I can see you but when you go out of the door, I won't be able to see you. You will be just a name. Oh, doctor, I am not giving you a line. My head is just like that.' And she taps the foot of the bed. At times, however, the nurses and the other patients get her interested in card games or other amusements and she will forget about this worry and her face will take on a fairly cheerful expression . . . . There is a slight increase in the psychomotor activity, patient being quite talkative about her troubles and, on the other hand, when her attention is away from her troubles there is no retardation. Because of the history of recovery from previous depressions, the hospital statistically labelled her case one of manic-depressive, depressed type." However, "the general symptomatology is much more suggestive of a curious conversion hysteria, with the conversion symptoms related to the intellectual function rather than to her muscular apparatus." This condition continued with very little change except that she did have periods when she would seem reasonably well and would get along comfortably, but were followed by exacerbations of her depression. She was discharged home on trial visit February 2, 1936.

When first seen personally on February 4, 1936, she presented no signs which could be called psychotic. There was, however, a very marked anhedonic state. She "eats without knowing what the food tastes like," that is, while she eats well from the point of view of nutrition, it gives her neither pleasure nor satisfaction, nor even what she calls "taste." She can sleep only with the aid of sedatives. She says there is a marked lack of feeling and absence of the sense of stimulation when she meets others or under those circumstances which ordinarily arouse emotion of one type or another. She feels no concern over the state of the family; she has no sexual desire. The sexual act is performed to please her husband; there is neither passion, orgasm nor satisfaction.

The most interesting symptom is the obsessive unreality. She complains there is no sense of the recognition of anything. When she sees a person whom she knows, she recognizes him intellectually, but there is no *feeling* of having met him before or of familiarity. After he leaves the room she cannot "imagine" him. She cannot *think* what he looks like. If pressed, she can describe him, but only if the characteristics are suggested to her; that is, she will not accept the statement that he is short if he is tall; she does not spontaneously seem to reach the conclusion that he is tall. Similarly, she cannot *feel* the familiarity of any room in her own house, and when away from her husband or child, she cannot "imagine" what they look like. Her own body, when she strokes it, does not give her a normal feeling, although she does discriminate between sensations such as heat, cold, pressure, etc. There is a constant circle of questioning in her mind: How is this? Why do people talk? How do words come to mean what they do? What are noses,

eyes? Trees are especially strange to her. There is a very marked envy of those who can move, act and talk with feeling and spontaneity.

She continued to improve in most ways very rapidly, became stronger, and could do her own housework without too much fatigue. Appetite improved; sleep was natural without the use of drugs. The restlessness and listlessness disappeared. There was considerable complaint for a time of stomach trouble, such as belching, bloating, etc. The sense of unreality persisted for six months and gradually wore off until at the present time she is substantially well, although she states that she never feels quite as cheerful or active as formerly and from time to time feelings of unreality "pop" in upon her.

Summary.—A woman who has had two minor attacks of mental depression, probably then classified as a neurosis, develops after a psychological trauma of severe grade a mental condition in which she became definitely psychotic, in which the principal symptom was the feeling and belief that she was dead. In the recovery process the delusion disappeared, but there was a marked unreality syndrome present, together with the signs of a severe neurosis. The unreality feeling seems to have been a direct transition from the delusion of having been dead or, vice versa, the delusion of having been dead may be called a severe manifestation of the unreality feeling. With this, there was a lack of the feeling of familiarity and recognition. The recovery process passed through the stages of a psychosis, a severe neurosis, a moderate neurosis, and at the present time residuals of her condition still persist in a mild neurasthenia although she is substantially well.

Case 6.—Male, 23 years of age, single. Family history is apparently negative. He was first seen on April 16, 1928. The outstanding facts about his personality are, first, that he is of a shut-in nature, in the sense that he finds it difficult to mingle freely with other people, feels shy, embarrassed and inferior. The social relationships, therefore, are associated with an anxiety, which is marked by a severe bodily reverberations. By bodily reverberations is meant that he has a feeling that he flushes, his heart pounds, he has paresthesiæ in his neck, and sensations of adverse type throughout his organism, even involving the genitalia. Because of, or coincident with, these adverse reactions, he has gradually retreated from social contact and makes only those which seem essential to his existence: first, those of the family life which are cut down to a minimum; and second, those of the work life. He is uncommunicative to his fellow employees, does not enter into their conversation unless addressed, and has as little as possible to do with the people who visit his place of work. Despite a fair education, he has become an elevator operator, largely because of these reactions and the consequent behavior deterioration. Third, such sexual relations as seem to him essential to his health have been carried on. The starkly physical side

of sex has been completely divorced from anything like sentiment, passion, love or even social pleasure. What is easily discernible in all his reactions is that they have become gradually concentrated around a quest for health, and that he suffers from an extreme hypochondriasis. At the time he was first seen, the main complaint was a queer sensation on the right side of the neck which, as time went on, became linked up with paresthesiæ throughout the rest of his body, which have the typical rich elaboration and efflorescence. He has a "dead" sensation in his hands at times, and frequently throughout his letters there occurs the statement that he feels dead. These are ice-cold sensations which run from his chest to his head. There are also burning sensations of the rectum, genitalia, inside his head, etc.

At one time in the course of the evolution of his illness, which has gone on under observation up to the present time, he believed that there was a radio or some instrument with wires in his head. This was not part of a persecution complex but was a delusional interpretation of the paresthesiæ which he experienced. Lately, the paresthesiæ are interpreted as follows: that his body is divided into two parts, on the left it is light, and on the right it is heavy. Conspicuous in the development of his symptoms is the feeling of unreality about his body. It seems to float away or to be insecurely anchored to the ground. This is a common symptom in the neuroses and in minor degree is present as the sense of uncertainty. With all these symptoms there was a marked anhedonia. The only desire left was to feel desire as other people did. This lack of desire finally extended to food, social relationships, sex, entertainment and work.

The etiology, as he believes, is a chronic masturbation which started in his early youth (at eleven or twelve) and extended up to four months before he was committed to the Boston State Hospital, and which ceased only during a period of about four years when he was having regular sexual intercourse, but always with prostitutes. With this there developed the idea of sin and inferiority which differed from the delusion of punishment by God merely because he substituted the Goddess Nature for the Deity of the Christian religion.

During the past two years there has been a constant shifting from somatic delusion to somatic hypochondriasis. At times his body is dead; at other times it merely feels dead. At times he has a radio in his head; at other times it is as if there were a radio there. The retreat from activity and social relationship, because of anxiety and abnormal sensation, has been complete.

He was admitted to the Boston Psychopathic Hospital on June 20, 1936. Their records state that he was a "nervous, quiet individual who was not easily distracted during examination but was restless. He was cooperative. He ate well and slept well, and mixed with the other patients to a certain extent but was more or less seclusive. His stream of talk was normal except for the great elaboration of his symptoms. He appeared depressed, expressed the belief that he had trouble inside his head, had a feeling of pain or discomfort in the back of his right ear which was connected in some way with the pain in his stomach, and that these were brought on by masturbation

many years ago. He was discharged on July 1, 1936, to the Boston State Hospital. Diagnosis manic-depressive, depressed." He has remained at the latter hospital since that time.

There is, first of all, a complete retreat from any activity. He is unable to work. He is seclusive so far as contact with other patients are concerned and the superficial impression he gives is one of schizophrenia. There is a constant shift from hypochondriasis to somatic delusion and back again. This appears very conspicuous in the copious and repetitious letters which he writes. These letters are expressive of anxiety and unreality. There is a constant cry for attention and help. Psychomotor activity is limited to those motions essential to living.

Although the outer aspect is that of schizophrenia, examination reveals the fact that he still suffers from neurosis. There is a feeling of lost energy, a complete absence of desire and satisfaction. Paresthesiæ, which at times are delusionally interpreted, at other times become the outward symbols of hypochondriasis. There is a feeling of unreality which definitely shifts from time to time into a falsification of reality. In his retrospective analysis of his life, he attributes his trouble to masturbation and believes that operation on the sexual organs or some shift of sexual health or vigor would cure him.

Summary.—This is the type of case in which a neurosis brings about complete retreat from all activity which, in my opinion, will be permanent. Conduct deterioration in all spheres takes place and the world becomes narrowed down to concern about the body. The abnormal paresthesiæ which arise are at times interpreted from the standpoint of ill health, at other times become definite delusions of the somatic type. In other words, the boundary between neurosis and psychosis is entirely artificial in this man's case, the intensification of symptoms bringing about the psychosis, and the general life adaptability has become so impaired as to make commitment necessary. At all times, however, the neurotic manifestations are very marked.

Case 7.—Male, 21 years of age, single. He was first seen personally on April 8, 1935. "He has always been quite well. There is nothing indicating abnormal temperament or attitude. He is a mechanic by occupation. It is stated his trouble began about six months ago when he was jilted by a girl, or the affair was broken off by the girl's parents who objected because she was too young. Following this, it is said, he became very much depressed. The depression increased steadily until within the last three months it has been almost impossible to get him out of doors because he is brooding all the time."

When the brooding is analyzed, it is found to consist of a complete absence of the normal sensations which one expects in relation to eating, sleeping, working, contact with others, sexual stimulations, and even such matters as the effect of heat, cold, sunshine, darkness and the like. There is an absence

of the familiar sensation and the substitution of a dead feeling. This is the only topic which the patient will discuss. Concerning this, he is repetitious, intensely analytic, and it absorbs his entire attention. (1) He can taste all the different kinds of food, but he gets no pleasure from food and he has no desire to eat. He "does not care if he never eats." (2) Likewise, he is never thirsty. He knows when he drinks and can discriminate different types of drinks, but they all taste the same to him; he has no desire for drinking. He used to like beer and wine and now when he drinks them, he gets no "kick." (3) There is no sexual stimulation from women; they all look alike to him—without beauty or grace. (4) He has gone to baseball games but remained entirely unaffected by the excitement. The players look like puppets. He feels like a puppet too. (5) Voices sound unreal; they do not stay in his mind. (6) The only "mad" feeling he gets is because he is not normal. No situation arouses him to anger. He states that he has no emotion except some degree of affection for his parents. This is the only thing left which makes him feel that he is not dead. His head and mind are dead. His stomach feels dead-like, having been pulled down. His hands and feet feel dead. His skin feels dead and drawn up. He states that his hearing is all right, but the skin around the ears is dead-like. He believes he has no mind at all. "You know how a nut is, with two eyes and two ears, but the whole inside feels there is nothing inside at all." He complains of a silent feeling inside of him all along. At times he has banged his head against the wall or struck himself forcibly. This is not in self-reproach but to arouse normal sensation. Pain would be preferable to the dead feeling.

He complains bitterly that when he goes out into the sun, he feels nothing. The warmth is not experienced, although he knows it is warmer than on a cold day. Similarly with every sensory experience. He has carried on violent experiments to bring about sensation. He continually explores his body to see if sensation has returned.

During the period when he started to improve, he gave the following account of his condition: Prior to the time when his body felt dead, there was a time when his body seemed to pain all over. There was a feeling that the blood was swishing around throughout his whole organism, whereas at the height of his illness, it seemed there was no blood at all. He was consicous of his heart over-acting. During the height of the anhedonic reaction, there was a feeling as if he had no heart, and he would have welcomed pain. There was marked agitation in the sense of walking up and down, wringing of the hands and picking at the face. (Incidentally, it has long seemed to me that the cracking of joints and picking at various parts of the body, commonly seen in the neuroses, is an effort to relieve "dead" feeling.)

About a year after the onset of his illness, he commenced to improve. During the improvement stage, he stated that he "could now feel something of the different qualities of sensation; the sun now has some pleasurable stimulation." He can now feel the wind. There is some appreciation of the different tastes of different kinds of food. There is some sense of pleasure in contact with others, although this remained at a low level.

This improvement lasted for about two months and was followed by a stage of euphoria and hyperactivity. He then stated that "he has many plans for inventions which are going to make a great deal of money; that he is very well; there is nothing the matter with him and that nothing has ever been the matter with him. He eats very well, is constantly on the go. He has gained weight, is full of energy." Because of his hyperactivity and his unrestricted interest in the affairs of others, he became socially disturbing and was brought by the police to the Boston Psychopathic Hospital on October 23, 1935. His grandiose ideas were extreme at this time. These need not be detailed. Through radio waves, he could control the world. He was in complete mastery of television. He pleased everyone and the Lord had given him power to do what he wanted to. These ideas were expressed with great variation. During his stay in the Boston Psychopathic Hospital he again became somewhat depressed. He became afraid, suspicious of the examination. The stream of thought became less than normal and he abandoned almost entirely his ideas of grandeur. The manic state lasted less than two weeks. The hospital diagnosis was undiagnosed psychosis—manic-depressive. He was then transferred to the Boston State Hospital on October 31, 1935.

At the Boston State Hospital he became denudative and in a very short time showed excitement, flight of ideas, volubility and hypermotility. There was a tendency to rhyme. He remained in the hospital until July 26, 1936, when he was released against advice. During his stay he developed ideas of persecution, thought he was poisoned, felt electricity playing through his body; that the hospital was influencing him by this instrumentation. His conversation became quite irrelevant and more or less split up. A sample is the following: "Father and Jesus Christ will let me go. Headaches lie. Too many schools, I know. I can't stand any more. Even Dr. Myerson, you're no good. I can tell by radio. No stalling." From November 7 until December he was in an over-active and over-talkative state and most of the time was receiving treatment in packs. At one time he had attempted suicide, refused to eat, and had to be tube fed. He improved sufficiently so that he was discharged and at the present time is in the community. Just what his present condition is, it is impossible to state since he and his family have refused further examination.

Summary.—When closely studied the symptoms range as follows: (1) a stage of over-response to stimulation with the body agog with all kinds of abnormal sensations; (2) a stage of complete disappearance of the feeling of reality so that his body felt dead, and there was the detailed complaint that nothing gave the former pleasure, satisfaction or even sensation. This became delusional and occasioned savage experiments on himself to restore sensation. This was followed by (3) a stage of excitement and grandiose ideas of short duration, typically manic, and then occurred (4) a recurrence of the dead feelings with depression, so-

matic delusion so that he had to be tube fed and restrained from self-injury. There was sufficient recovery to enable him to go back into the community. In other words, there seems to be a relationship between paresthesiæ and delusion formation. At one stage the paresthesiæ are the familiar ones of the neurosis; in another, the disappearance of sensation is associated with a psychosis, extremely suggestive of the depressed phase of manic-depressive psychosis.

DISCUSSION.

A disturbing implication of the evolution and history of these cases presents itself quite forcibly. To the question which comes up whether the term "psychosis" has any important value for psychiatry at the present time, the logical answer seems to me to be—no.

It was an important event in the history of psychiatry when the lunatic asylum changed its status to the hospital for mental diseases. This marked the beginning of an era when mental disease became officially welded into medicine and quite completely separated from theology and law. Tradition and the binding hold of old beliefs, however, do not easily disappear, and their hampering influence may be manifest in the face of new attitudes and points of view. When the term insanity was dropped from psychiatry, the term "psychosis" was substituted for it, just as psychotic took the place of the adjective "insane." But no substantial gain is recorded in this change. Psychiatrists hesitate to use the terms *psychosis* or *psychotic* unless there is enough divergence from normality to warrant committability, so that in the last analysis a factor which is not diagnostic, but either legal or therapeutic obscures the situation. One still reads in hospital records the diagnosis: "Not insane, no psychosis" or "Unclassified depression" or some such term, merely because the individual is not sick enough to have reached irresponsibility or committability. But these are not considerations which have anything to do with diagnosis, any more than the size of a cavity has to do with tuberculosis, or the fact that a bone is merely partly broken excludes fracture. A disease process does not take on new values or merit a new name at a certain stage of its development. Manic-depressive disease is the same process

whether the patient is clear, coherent and with insight, or whether he is definitely confused, deluded and retarded.

Thus, in the cases presented here, the ailment of any one of the individuals may be classified at one time as a neurosis and at another stage, when it has in no essential changed its character, the ailment becomes something verbally quite different—a psychosis. This is as if a tubercular infiltration of the lung was somehow to be considered separately and to receive a different name when it evolved by more serious development into the stage of cavitation, or if the paresis which resulted from a relatively mild cerebral arterial accident were to be considered as a different clinical entity than the complete hemiplegia due to a more severe cerebral arterial injury.

A "mild" case of dementia præcox at the stage when the individual is not committable and has as yet not been challenged as to his responsibility is in no wise different, *medically,* from one in which the development of the disease has reached the point where the patient must be committed or has, from the legal point of view, become irresponsible.

If it were a mere question of names, the term psychosis might be retained but the situation is more important in that the name is symbolic of an attitude and tends to govern psychiatric activity. Not enough attention is paid to the previous health history of the patient, insofar, for example, as neurosis is concerned, when a patient is committed to a state or private institution for mental diseases. The attention of the examiner is focused upon the first appearance of the psychosis; that is, when delusions, hallucinations or abnormal conduct of a gross type appeared. The long history of complaints of the individual, when he felt sick or complained of visceral disorder, lowered energy and abnormal sensation is passed over very briefly and yet, in my opinion, the main period of the evolution of the disorder is being neglected and perhaps the only period at which successful treatment can be instituted. *Moreover, the examination made in the hospitals has become a formula for the detection of psychoses rather than a clinical examination made for the purposes of detecting the total disability of the individual.* It is rare to see in the records of an institution what the total energy of the individual is or how energetic he feels himself to be. Inquiry is rarely made into the various appetites or into

the paresthesiæ experienced throughout the body. Sleep is recorded, but a study of *its recuperative value* to the individual is not made. The reaction of the organs of the body to the stimulations of the institution and the sensations which the individual experiences as a result remain unknown, insofar as the records of the institutions show.

An individual may retreat into what seems to be an apathy because he has delusions of persecution, but he may present the same picture if he finds it too difficult and too painful, as measured by his own inner reactions, to meet the world. The outward result may be the same, but the motive, if we concede that there are such things as motives, may be entirely different in the two cases. It is of some importance, I believe, if it can be shown that the patient who believes he is being filled with electricity has in the past complained that he has tingling and numb sensations in his extremities. The delusion thus will appear as an elaboration of the paresthesiæ, a matter which is of great importance for psychiatry to establish or to refute. The somatic delusion generally speaking has, I believe, an early background of hypochondriasis of the neurotic variety, as is shown in Case 1 of this series. The patient fears or believes she has heart disease and other somatic disorders during the most of her career, and only at certain times develops the idea that the organs are absent or fantastically changed. At such time insight has been entirely lost and paresthesia has passed over into delusion; the neurosis has become a psychosis, although in reality no new disease has appeared.

That these observations have been made by other writers goes without saying. Bleuler * especially lays a good deal of stress on the relationship of somatic hallucinations to somatic paresthesiæ. He states substantially as follows: "The patients first consult concerning those disagreeable sensations which they recognize as such, and this is the neurasthenic stage. Perhaps a year later the patient reaches the conclusion that someone has given him syphilis or some other disease, whose existence he is convinced of because

* "Primäre und sekundäre Symptome der Schizophrenië." Ztsch. f. d. ges. Neurol. u. Psychiat., 124: 607-672, 1930. See also Adolf Meyers: "The relation of psychogenic disorders to deterioration." J. Nerv. and Ment. Dis. 34: 113-116, 1907.

of the paresthesiæ, and this is the hypochondriacal stage (*sic*). After a time he feels that people are playing on him with machines, and this is the psychotic and paranoid stage."

The point, however, is this—the patient has dementia præcox whether or not he has a psychosis, and it is just as important for us to study his case intensively at the stage where he merely has paresthesiæ and is neurasthenic as to pay attention to the stage where the symptoms have become developed into paranoia. By concentrating on the psychosis, the previous stage is skimmed over, and the evolution or genesis of the psychotic stage is made vague, ill-defined and floats without a past history. Even for Bleuler, this genesis plays a very unimportant rôle, if one judges by the very short space he gives to this neurasthenic period as compared to the elaborate and almost endless analysis made of the developed stage, an analysis which in addition to its essential confusion is quite futile. If more attention were given to these early neurotic stages, it is likely that the later stages would be much better understood and possibly better treated.

Whether the term psychosis is retained or not, it is incumbent upon psychiatry to study with especial keenness and with all the instrumentation of the present day those precursive stages which lead in many instances to hospitalization, although the majority go on to recovery or, at any rate, never reach the stage of hospitalization. The term neurosis is probably not much better than the term psychosis, yet the alteration of mood, energy, reaction to stimulation, altered visceral activity, and further the changes in attention, intellectual activity and general personality, which they always present, make them the most important psychiatric problem, both in their own right and in their potentiality of further development.

Comment.

CONTINUED UNREST IN MASSACHUSETTS.

In our May 1937 issue the hope was expressed that the low point in the curve of demoralization in the administration of the mental hospital services in Massachusetts had been reached, and that better days were ahead. Now, eight months later, it is impossible to record a realization of that hope. In the comment in May it was noted that a special commission had been appointed by the Governor to study the problem of the state hospital system of the Commonwealth. The commission has now filed its report, together with the recommendation that the life of the commission be extended for another year to permit it to continue its investigations. The report of the commission leaves much to be desired. It has submitted a draft of proposed legislation in which it is recommended that the Department of Mental Diseases be abolished and replaced by a Department of Mental Health. Whether the proposed new department would justify its name in view of the fact that it would be under a three man control—a commissioner and two associate commissioners—all appointees of the Governor, may be a matter of interesting speculation. The present boards of trustees of the hospitals would be deprived of almost all their present duties and would have power neither of appointment nor veto in the selection of a superintendent. Moreover, in the transfer of authority from the existing Department to the proposed Department of Mental Health the retention of all employees—civil service or otherwise—would be subject to the approval of the commissioner.

The report of the special commission contains certain progressive recommendations, as, for example, that the chief administrative officers should be diplomates of the American Board of Psychiatry and Neurology, and that superintendents of hospitals appointed in the future should likewise be diplomates of the American Board; further, that in the program of building and maintenance economies might be effected by greater standardization both as to types of buildings for specific purposes and in equipment generally. It

should be noted that the recommendation as to the qualifications of medical officers in the Department and the services represents no new departure. Both Dr. Overholser and Dr. May, former commissioners, and the great majority of the superintendents of Massachusetts state hospitals are diplomates of the American Board of Psychiatry and Neurology.

A noticeable feature of the report, which tends to weaken its authority, is the fact that the work of former administrators is passed over slightingly; even Dr. Kline, whose pioneer achievements are duly recorded, is subjected to criticism. The report dwells, however, on "the excellence of care provided by the state for the mentally ill" hitherto, which has been internationally recognized, and points to the chaotic conditions in the Department which has been left "without an active legal head" since the enforced retirement of Dr. Overholser in December 1936 when he was replaced by Dr. David L. Williams, a man without the necessary qualifications for this office. In May 1937 the present Governor of Massachusetts was quoted as having given the new commissioner a choice between retiring or being ousted. The report states that Dr. Williams has not been in his office at the State House since that time, but he is still commissioner at least in name.

The latest upheaval in the Massachusetts service followed the death of two patients in the Medfield State Hospital in January of this year, as a result of the violence of another patient. There is probably no large hospital in which there has not occurred the occasional unforeseen attack of one patient upon another. The situation is, as an editorial in the Boston *Transcript* puts it so well, "in every way regrettable, but who can say that where the state bears responsibility for the care of as many as twenty-eight thousand persons suffering various complicated and often obscure types of mental derangement, any available power can prevent occasional breaches? When certain politicians shout that such episodes give positive evidence of incompetent administration, their attacks should be considered as suspicious in motive as they may be unreasonable in fact." The disturbing thing is that the Governor should have felt called upon to reopen and reinvestigate all the cases of violent death which have occurred in state institutions during the past ten years. He is reported to have ordered the Commissioner of Public Safety with a corps of detectives to conduct the investigation, and

these doings are headlined from day to day in the public press. Many of those who read the sensational newspaper reports may not be aware that whenever a sudden death occurs in a hospital it is reported to the Department and investigated by the Department's pathologist. Death certificates are signed by the medical examiner and if in his judgment circumstances warrant he reports the matter to the district attorney. All of these cases have thus been acted upon properly and in extremely few of them were there actual homicidal deaths, although implications in the press reports would appear to be otherwise. The cases, once investigated, dealt with and closed, it is difficult to see what purpose reopening them can have beyond aggravating the anxiety in the public mind.

Under this continued political manœuvering the reputation of Massachusetts in the field of mental health continues to suffer, morale in the hospitals is being undermined and the welfare of the patients prejudiced. It is not strange that experienced and competent men in the state service should be seeking positions elsewhere, or that recent graduates of medical schools should hesitate to enter the service in which physicians were formerly proud to find themselves.

We close with a further quotation from the Boston *Transcript*, "Governor Hurley, in justice to the people of Massachusetts and in fairness to his own reputation, cannot permit this situation to continue. The Governor should comb the state for a man of the most potent quality and recognized professional standing to become the active and assured head of the Department of Mental Diseases. It may be impossible for the Governor to accomplish important reductions of the state's expenditures in dollars and cents, but at least he should be able to secure adequate return for the money that is spent in terms of daily efficiency and responsible official performance of duty."

ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

Comments on the Mental Health Program.

Annual meetings of The American Public Health Association and related organizations were held in New York, October 5 to 8, 1937. This assembly of the nation's foremost authorities on hygiene

and public health, since all phases of these subjects are covered, should represent the present state of progress in the field of preventive medicine. A review of this meeting, with particular emphasis on papers devoted to mental hygiene or related subjects, therefore, is of interest to psychiatry and mental hygiene because these contributions may be assumed to show the degree of interest that has developed in mental health. It should further indicate the extent to which mental health methods have been integrated into public health. Furthermore observation of the interest shown in current contributions may indicate the avenues by which future public health interest in mental health may be promoted.

The American Public Health Association functions through ten sections and in cooperation with related organizations. These ten sections, in the order of their organization, are as follows: Laboratory, 1899; Health Officers, 1908; Vital Statistics, 1908; Public Health Engineering, 1911; Industrial Hygiene, 1914; Food and Nutrition, 1917; Child Hygiene, 1921; Public Health Education, 1922; Public Health Nursing, 1923; Epidemiology, 1929. This organization sequence rather clearly indicates that public health, through its association, has kept pace with the progress of medicine in other fields; it also shows that like medicine generally, it has developed into a system of diverse groups of specialized interest.

At the special session on Mental Hygiene, Dr. Grant Fleming, Dean of the Faculty of Medicine, McGill University, Montreal, presided. Dr. Allen W. Freeman, School of Hygiene and Public Health, Johns Hopkins University, discussed "Mental Hygiene and The Health Department" from the standpoint of the administrative health officer. He stated that four requirements must be fulfilled for the integration of mental hygiene in a practical public health program: 1. It should be preventive; 2. It should be capable of general application; 3. It should be reasonable in cost; 4. It should be applicable by personnel of all orders, not alone those specially trained. Dr. Freeman believes that neither psychiatry nor public health alone can furnish the necessary personnel but that it must be developed by both sciences jointly, for which purpose coordination between health departments and mental hygiene and child guidance clinics is necessary.

Dr. Henry Elkind, Medical Director, Massachusetts Society for Mental Hygiene, presented a paper entitled "Is There an Epi-

demiology of Mental Disease?" He illustrated the application of epidemiological study to mental disease by statistical analyses of a group of hospital cases, showing rates of admission in relation to seasonal variation, specific conditions, urban or rural origin and sex.

Dr. C. M. Hincks, General Director, The National Committee for Mental Hygiene, spoke on the topic "Mental Hygiene, Past Achievements and Promising Leads." Tracing the development of the mental hygiene movement to date, Dr. Hincks emphasized the need of investigative work if advance is to be more rapid in the future. It is encouraging to note that national foundations have demonstrated an interest in mental health research. More help must be sought from this quarter.

Illustrating avenues of future approach, Dr. Hincks stated that the present Canadian program calls for: 1. Provision for individualized treatment for recoverable cases; 2. Provision of two per cent of the mental hygiene budget for research; 3. Development of partnership between health workers and educators; 4. Integration of mental hygiene into public health, correlation and supervision of mental hygiene by the concerted action of public health, social and mental hygiene forces.

Dr. Julius Levy, Director, Bureau Maternal and Child Health, New Jersey State Board of Health, presented a paper entitled "An Experiment in Training Nurses to Help Mothers in Preventive Mental Hygiene." He stated that the purpose of the experiment is to determine: 1. Whether mothers can be helped to understand child development in the mental as well as the physical hygiene field; 2. Whether public health nurses can be educated to understand mental health principles sufficiently to help mothers in the establishment of wholesome parent-child relationships. The plan provides for a training course in Newark University and the establishment of a group of field supervisors under whom the nurse works in making practical application of guidance advice. The objective is entirely preventive and no effort is made to treat cases of behavior disorder. This experiment has been in progress two years and results are said to be very encouraging.

In the Child Hygiene Section, Surgeon L. M. Rogers, Medical Officer in Charge, Field Studies in Mental Hygiene, U. S. Public Health Service, Lexington, Kentucky, presented a paper entitled "Mental Hygiene and Public Health," in which he described a field

study that has recently been established by The United States Public Health Service in Fayette County, Kentucky. The purpose of the study is to determine factors and conditions concerned in mental maladjustment, and the establishment of a practical program of community mental hygiene. The basic orientation is bio-social, dealing comprehensively with physical, mental and sociological factors.

The plan provides: 1. A cooperative diagnostic, consultation, and registration center for community study of individual factors; 2. A cooperative community study of environmental factors. The objective is to increase lay understanding of mental health problems and to stimulate a greater sense of community responsibility for their care.

Discussions of mental health topics found their way into various other section meetings of this notable congress, indicating the increasing recognition of the importance of these problems in all phases of medicine and public health. Among these contributions may be mentioned a paper on the homicide situation in the United States, read before The Vital Statistics Section; a paper on plasma lipoids in the differential diagnosis of hyperthyroidism and anxiety states, read before the Laboratory Section; a paper on diagnosing and curing the accident habit read before the Industrial Hygiene Section.

A paper entitled "The Mental Hygienist" by Dr. Ross McC. Chapman, President of The American Psychiatric Association, was read before The American Association of School Physicians which convened at the same time.

News and Notes.

AMERICAN ORTHOPSYCHIATRIC ASSOCIATION, ANNUAL MEETING.—The fifteenth annual meeting of the American Orthopsychiatric Association will be held at the Stevens Hotel, Chicago, Ill., February 24, 25 and 26, 1938. Dr. Norvelle C. LaMar is secretary of the Association, and inquiries may be addressed to him at 210 East 68th St., New York City.

REPORT OF NOMINATING COMMITTEE.—In accordance with Article VI of the Constitution of The American Psychiatric Association, the Nominating Committee herewith reports the following nominations to the membership of the Association, to be acted upon at the ninety-fourth annual meeting in San Francisco, Calif., June 6 to 10, 1938:

For President: Richard H. Hutchings, M. D., New York.
For President-Elect: William C. Sandy, M. D., Pennsylvania.
For Secretary-Treasurer: Arthur H. Ruggles, M. D., Rhode Island.
For Councillors for three years: Ross McC. Chapman, M. D., Maryland; Glenn E. Myers, M. D., California; Arthur P. Noyes, M. D., Pennsylvania, Henry Woltman, M. D., Minnesota.
For Auditor for three years: Thomas A. Ratliff, M. D., Ohio.

GEORGE F. INCH, M. D.,
WILLIAM J. TIFFANY, M. D.,
EARL D. BOND, M. D.,
KARL A. MENNINGER, M. D.,
MARCUS A. CURRY, M. D., *Chairman.*

THE AMERICAN PHYSICIANS' ART ASSOCIATION, a national organization of medical men who have ability in the fine arts, will hold a *first national exhibition* in the San Francisco Museum of Art, San Francisco, Calif., in June, 1938. (The American Medical Association Convention is June 13-17 in the same city.) The American Physicians' Art Association already has an outstand-

ing membership. There are three classifications for membership: active, associate and contributing. The *first annual exhibition* promises to be of unusual interest with entries to be accepted (after jury selection) in the following classifications: oils, water-colors, sculpture, photography, pastels, etchings, crayon and pen and ink drawings (including cartoons), wood carvings and book bindings. Scientific medical art work will not be accepted. The exhibition is not limited to first showings. All entries close April 1, 1938. Any physician interested should communicate at once with the Secretary of the American Physicians' Art Association, Suite 521-536, Flood Bldg., San Francisco, Calif.

DIPLOMATES OF THE AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY, INC.—The following Diplomates were certified at the meeting held in New York City, December 29 and 30, 1937:

PSYCHIATRY AND NEUROLOGY.

Avery, Loren W.	Chicago, Ill.
Barron, A. A.	Charlotte, N. C.
Bell, Aaron	New York, N. Y.
Bell, Robert	Taunton, Mass.
Brawner, Albert	Smyrna, Ga.
Chesher, Earl C.	New York, N. Y.
Cobb, Stanley	Boston, Mass.
Colomb, Henry O.	Middletown, Conn.
Conzelman, Fred J.	Stockton, Calif.
Donahue, Julia M.	Massillon, Ohio.
Doty, Edwin J.	New York, N. Y.
Epstein, Samuel H.	Boston, Mass.
Farnell, Frederic	Providence, R. I.
Flowers, Hiland L.	New York, N. Y.
Guidone, Erel L.	Harding, Mass.
Holt, Earl K.	Medfield, Mass.
Howard, Edgerton	Boston, Mass.
Hughes, William N.	Providence, R. I.
Kahn, Eugen	West Haven, Conn.
Kamman, Gordon R.	St. Paul, Minn.
McDermott, William V.	Salem, Mass.
McFadden, James F.	St. Louis, Mo.
McKinley, John C.	Minneapolis, Minn.
Michael, Joseph C.	Minneapolis, Minn.
Michaels, Joseph G.	Boston, Mass.

Ornstein, Abraham M.	Philadelphia, Pa.
Pearson, Gerald	Philadelphia, Pa.
Pillersdorf, Louis	Cleveland, Ohio.
Podall, Harry C.	Norristown, Pa.
Poliak, Percy P.	New York, N. Y.
Rosenheck, Charles	New York, N. Y.
Sharp, Edward A.	Buffalo, N. Y.
Sloane, Paul	Philadelphia, Pa.
Smith, E. Rogers	Indianapolis, Ind.
Stearns, Albert W.	Boston, Mass.
Strecker, Edward A.	Philadelphia, Pa.
Tiffany, Wm. J.	Albany, N. Y.
Wall, Conrad	Worcester, Mass.
Warren, David E.	Passaic, N. J.
Weigner, Walter C.	Providence, R. I.
Wholey, Cornelius	Pittsburgh, Pa.
Wolfsohn, Julian M.	San Francisco, Calif.
Wortis, S. Bernard	New York, N. Y.
Yorshis, Morris	Worcester, Mass.

PSYCHIATRY.

Alexander, Franz	Chicago, Ill.
Atkinson, Velma H.	Hathorne, Mass.
Bache, Irma	Boston, Mass.
Barton, Walter E.	Worcester, Mass.
Baskett, Olive T.	Retreat, Pa.
Blalock, Joseph R.	New York, N. Y.
Brady, Emory J.	Colorado Springs, Colo.
Chittick, Rupert A.	Waverley, Mass.
Dehne, Theodore L.	Philadelphia, Pa.
Donahue, Julia M.	Massillon, Ohio.
Doshay, Lewis	Bronx, N. Y.
Edelstein, John E.	Brentwood, N. Y.
Farrell, Malcolm	Waltham, Mass.
Frederick, John N.	Pittsburgh, Pa.
Gagnon, Solomon	Waltham, Mass.
Gavigan, Arthur J.	Worcester, Mass.
Goldwyn, Jacob	Worcester, Mass.
Greene, Ransome	Waverley, Mass.
Hutchings, Richard	Utica, N. Y.
Inman, William C.	Hathorne, Mass.
Jordan, Paul H.	Worcester, Mass.
Kirkpatrick, Milton	Worcester, Mass.
Mack, Clifford W.	Livermore, Calif.
MacRobert, Russell G.	New York, N. Y.

McNiel, Edwin E.....New York, N. Y.
Newell, Horatio W.....Baltimore, Md.
Osterheld, Roger G.....Taunton, Mass.
Raymond, Charles S.....Wrentham, Mass.
Scott, William A.....Kalamazoo, Mich.
Solomon, Philip .....Boston, Mass.
Sommer, Conrad S.....Chicago, Ill.
Van Ophuijsen, Johan.....New York, N. Y.
Yerbury, Edgar C.....Boston, Mass.

NEUROLOGY.

Brussell, James A.....Brentwood, N. Y.
Davis, David B.....Grand Rapids, Mich.
Groff, Robert A.....Philadelphia, Pa.
Hahn, Ezra V.....Indianapolis, Ind.
Haines, William H.....Chicago, Ill.
Jackson, Arthur H.....Waterbury, Conn.
Menninger, Karl A.....Topeka, Kans.
Olsen, Clarence W.....Los Angeles, Calif.
Ordway, Mabel D.....Boston, Mass.
Overholser, Winfred .....Washington, D. C.
Pietri, Raul .....New York, N. Y.
Scharf, John H.....New York, N. Y.
Soltz, Samuel E.....New York, N. Y.
Stein, Calvert .....Palmer, Mass.
Woodall, Charles S.....Waverley, Mass.

SPECIAL NOTICE.—Dr. Lee W. Darrah, East Gardner, Mass., was certified in Psychiatry, June, 1937. His name was unfortunately omitted from previous list.

INSULIN CONFERENCE—HARLEM VALLEY STATE HOSPITAL.—On November 18, 1937, Dr. John R. Ross, Superintendent of Harlem Valley State Hospital arranged a conference of all physicians who had taken the course of instruction in "Insulin Shock Therapy" given by Dr. Manfred Sakel at that institution.

The meeting was unique in that it represented the first gathering of its kind in America. It was attended by about one hundred physicians who are devoting their full time to this new form of therapy and who had under their care at the time of the meeting upwards of one thousand patients.

During the morning, clinics were given by the hospital staff in the administration of both insulin and metrazol. A round table

discussion was held in the afternoon led by Dr. Nolan D. C. Lewis with Dr. Sakel assisting. A wide diversity of views on the value of the treatment were expressed by the various speakers. One claimed better results in a series of controls than in the insulin series. The majority, however, reported encouraging results. From the discussions it was interesting to note an element of rivalry developing between the two new forms of therapy for schizophrenia, namely metrazol and insulin.

In the evening, members were guests of the Duchess County Psychiatrical Society and listened to papers on "The Pharmacological Shock Treatment of Chronic Schizophrenia" by Drs. I. Murray Rossman and William B. Cline Jr. and a paper on "The Combined Insulin and Metrazol Therapy" by Dr. Archibald Gaulocher.

GRADUATE COURSE AT THE MENNINGER CLINIC.—The fourth annual postgraduate course in *Neuropsychiatry in General Practice,* will be given April 25 to 30, inclusive, at the Menninger Clinic, Topeka, Kansas. The course this year will include a brief introduction to the fields of neurology and psychiatry and a specific application of this knowledge to the large group of cases of psychoneuroses, psychoses and psychogenic and neurological disorders which every physician meets in his daily practice. Suggestions made by those who took the course last year have been embodied in this year's program in order to make it applicable to the most common practical problems of the physician.

As in previous years, several guest speakers, prominent in the fields of neurology and psychiatry, will appear at the evening sessions of the course.

CALIFORNIA'S FIVE-YEAR STUDY PROGRAM FOR GRADUATES IN MEDICINE.—In a supplement to the November, 1937, issue of *California and Western Medicine,* a detailed outline is given of a "Five-Year Study Program for Graduates in Medicine." Practical courses are suggested in various phases of heart disease, diseases of the chest, lesions of the abdomen, gynecology, obstetrics, endocrinology, allergy, pediatrics, ophthalmology, otolaryngology, diseases of metabolism, genito-urinary and venereal infections, proc-

tology, diseases of the central nervous system, laboratory equipment and technique, drugs, vaccines and serums, and physiotherapy.

Arrangements may be made for any of these courses to be given in such convenient centers as Stockton, Fresno, Riverside, San Diego, Santa Barbara, etc. A group of county societies clustered around any of these centers may apply to the secretary of the California Medical Association, stating where and when the meetings are desired and the course chosen; whereupon an instructor will be assigned.

In the preliminary outline of the courses suggested in the field of diseases of the central nervous system, mention is made of "psychoses, psychoneuroses, etc."

Perhaps the psychiatrists of California are themselves to blame for the meagerness of the provision for postgraduate instruction offered in their field. At the same time, it can be said without exaggeration that physicians are least prepared to recognize psychiatric problems and to deal with them adequately, and are, therefore, most in need of post-graduate work in psychiatry and mental hygiene.

Book Reviews.

METHODS OF TREATMENT. Sixth Edition. By *Logan Clendening, M. D.* (St. Louis: C. V. Mosby Co., 1937.)

Everyone who practices medicine builds up his own method of treatment by the accumulation of his own experience with human nature in health and disease. With the help of such wisdom as he is capable of acquiring he absorbs the best of others' judgment until a more or less settled state of all round usage is reached which has been found personally to be of sound value.

There is a great deal to be said for passing on these personal opinions and conclusions by publication of a textbook on treatment. This is what Dr. Clendening has done, and done it well. This book is at once an encyclopædia of the technique of medical treatment of disease as well as that of the treatment of the patient himself. Under one cover, containing about 850 pages, full details of the use of drugs, the use of diets, the use of physiotherapy as well as minute directions on the various medical operations, such as spinal and cisternal punctures, paracentesis, pneumothorax, duodenal drainage, etc., are given remarkably clearly, and carefully illustrated. All through the book it is evident that the writer knows the snags that crop up when one really does these things. They seem not to be mentioned in the usual textbooks.

However, what impresses the reviewer most about this book is not the all inclusive nature and commonsense of the information—but something quite different. The author obviously has a deep understanding of human nature in the strictly scientific biological sense. Scientific medicine as practiced in the biochemical and physiological research sense by a good many physicians and surgeons, is not scientific at all. It is merely mechanistic medicine which frequently has missed the actual problem entirely. Dr. Clendening never misses the patient while aiming at the disease. Needless to say his understanding and emphasis on the grave importance of psychologic medicine is everywhere in evidence. All through the most technical description of the chemical and physical details of the disease under therapeutic discussion will be found short paragraphs or sentences so subtly worded that the problem from the patient's point of view is kept before one. This and this only is true scientific medicine. The reality of the truly scientific point of view is made more complete still by occasional anecdotes which give that pointed human touch laying bare the problem from just the right angle. The style of the writing is unusually attractive and everywhere there is a delightful sense of humor cropping up, quite unexpectedly—which is most refreshing and valuable.

TREVOR OWEN, M. D.,
University of Toronto.

THE HUMAN MIND. Second Edition. By *Karl A. Menninger.* (New York: Alfred A. Knopf, 1937.)

This book, according to the publisher's jacket, is "corrected, enlarged and rewritten" and is a very beautiful volume. It is called "The Human Mind," but it should have been called "A Lay Compendium of Psychiatry," for its contents correspond more to the mental diseases and the theories of psychiatry than to the relevant discussion of the human mind. For example, there are six pages on the brain and nervous activity, and the author definitely states, "For purposes of classification all human activity can be reduced to what is called the S-R formula." This S-R formula has been practically abandoned long ago, and if a formula must be used, the S-O-R formula, in which *O* the condition of the organism is as important as S-R, is the only acceptable one. The charts which illustrate brain activity are either primitive or quite inaccurate, as for example Fig. 5 on page 164, in which a more or less circular object, called the brain shows *P* (which is perception) connecting with a large central *I* (which is intelligence), this leading to *V* (which is volition) from which flow acts or deeds which go out to the rest of the organism or to the world. In no scheme of psychology is intelligence the starting point of volition. Conation, volition, or what you will is more related to almost any other function than to intelligence which usually acts merely to brake, delay or justify conduct.

Here is a book on the human mind in which nothing, practically speaking, is said of the influence of the glands on intelligence, general personality and activity. Practically nothing is said in any definite way about the autonomic nervous system, at least in any way in which even a lay reader could get the slightest knowledge of the subject. Here is a book in which the learning-teaching process and the various phases of educational psychology and the established data of social psychology are entirely neglected. The human mind is left floating in thin air with just a few vague references to its solid structural basis.

As for the depiction of psychiatry, all that one can say is that information and misinformation are given in a graphic, attractive and generally brilliant style. To the uncritical minded, this would appear to be a good book. To the critical minded there are certain phases of the book which are definitely misleading and quite contrary to the principles of good exposition. Dr. Menninger was undoubtedly an optimist when he was writing this book. His definition of mental health is something to be attained in Paradise rather than on this human scene. Happiness is his chief criterion of health-mindedness, but for the mature mind to be happy in the face of the trauma of this not-the-best-of-all-possible-worlds is to be tainted with euphoria rather than to react to reality.

The author starts off very properly with the constitution and heredity, insofar as they bear on his subject-matter. His bias is against heredity. For example on page 8, he cites the fact that the children of feebleminded parents sometimes become college professors. The reviewer would like to

know of a few such cases. Whatever studies have been made of cases of definitely established feeble-mindedness in parents have not shown any high-grade descendants. They need not be feebleminded, but certainly even the most jaundiced view of the ability of a college professor gives him at least average intelligence. In the citations which the author makes of the Report of the Committee of the American Neurological Association, he definitely mis-states the position of the Committee. The Committee found that despite the poor work done there *was* a hereditary background for dementia præcox, manic-depressive psychosis, much of feeblemindedness, and a good many (rather rare, it is true) types of nervous disease. This conclusion would never be deduced from the citation in "The Human Mind."

The unconquerable optimist appears on page 129 and in many places throughout the book. After discussing the difficulties of the melancholy man, he states, "And a wise friend will not be presumptuous. He will take you to a psychiatrist. Modern psychiatry has developed to a point comparable with the better-known and more spectacular achievements of major surgery. Surgery of the mind is often as necessary and as feasible as surgery of the abdomen." I wonder if any other psychiatrist in America would make this statement. Surgery deals with concrete, physical lesions, approachable by the knife; psychiatry, certainly in the case of melancholia or the melancholy situation, deals with so great a number of variables and so many unknowns that to compare any of its techniques with surgery can only charitably be called optimism. Psychiatry has many decades of hard scientific research work ahead of it before its therapeutic efficiency can be compared to that of modern surgery. The same kind of optimism occurs when the author discusses the cause of melancholia and where he definitely states that the problem of its etiology has been solved by Freud and his students, particularly Karl Abraham.

A similar flight away from reality is seen on page 149 where he says, "Theoretically, all of the neuroses are completely curable." Freud, however, does not think so; in fact, after discussing the actual neuroses, as he calls them, and attributing them on the whole to chemical and toxic changes, Freud states in his "Autobiography": "All that I am asserting is that the symptoms of these patients are not mentally determined or removable by analysis, but that they must be regarded as direct toxic consequences of disturbed sexual chemical processes." Since psychoanalysis is the main instrument which Menninger has in mind for the treatment of the neuroses, it is interesting to note that most psychoanalysts consider that only a relatively small group of the neuroses are treatable by this method. One should protest against this statement of Menninger's not only from the non-analytic point of view but from that of psychoanalysis.

A very interesting and typical section is that on "Over-Compensation." For example, the author states that there was an unconscious compensation in the case of Mozart, Beethoven, and Bruckner, in that all of them were deaf but became great musicians notwithstanding. Unfortunately for

this author's thesis, Mozart and Bruckner were not deaf, and furthermore, Beethoven had already shown his great abilities before deafness took place. Even if all of them were deaf, it would still remain true, as a very brilliant musical critic and student of music said in reference to this matter, that composers and performers in music do not show any appreciable amount of deafness. At the time that these musicians were living, and when Martineau, Pinturicchio, Julius Cæsar, George Washington, Theodore Roosevelt, and Thomas A. Edison, whom the author also cites, as over-compensating for deafness, were alive, millions of deaf people were in existence who showed neither musical ability nor greatness in any direction. Statistics may not be able to discover truth, but it is the most valuable instrument for uncovering error.

The book suffers throughout from the fallacy of the positive instance. Apparently if the author saw a red-headed girl riding a blue bicycle, he would conclude that there was some relationship between the red-headedness and the blueness of the bicycle. The fact that the next red-headed girl might be riding a black bicycle would not be taken into account as the essential control study. There is no evidence at all in the book that the author ever considers the disquieting coincidence of unrelated facts. The control study or experiment, the statistical evaluation by approved method is not apparently in his cosmos of thought; but without these there is no science.

The crowning statement appears on page 359: "Practically no intelligent and informed scientist today disputes the main thesis and findings of psychoanalysis." When the first shock to the reviewer's ego had subsided and his inferiority complex began to assert itself by action, a method of checking up this statement was devised. A questionnaire was sent out to a great many important scientists, presumably intelligent and informed (unless the definition of the author runs the vicious circle of assuming that only those who accept psychoanalysis are intelligent and informed). These included important professors of psychology; important professors, research workers and clinicians in the field of neurology and psychiatry; as well as men whom Dr. Menninger himself quotes with great respect. The questionnaire asked these individuals to place themselves in one of the four following categories: (1) Those who completely accept psychoanalysis; (2) those who feel very favorably inclined towards it but do not wholly accept it, practice other forms of psychotherapy, and are to a certain extent skeptical; (3) those who, in the main, tend to reject its tenets but feel that Freud has contributed indirectly to the human understanding; (4) those who feel that his work has, on the whole, hindered the progress of the understanding of the mental diseases and the neuroses and reject him entirely.

It will amaze Dr. Menninger to find that only one or two of these important men took the position of accepting psychoanalysis. Quite a good many agreed to the position of number 2, in that they accepted some of the tenets, practiced other forms of psychotherapy, and in addition were skeptical of many of the positions taken by psychoanalysis. Still more placed them-

selves either between 2 or 3, or in 3 itself, in which the position was on the whole friendly to Freud, believing that he had contributed at least indirectly to human understanding, *but rejecting in the main the tenets of psychoanalysis.* There were a few hardly souls who took the position of number 4. Naturally, the psychoanalysts were not polled. The poll is still going on, the results being so interesting as to make it worthwhile to elaborate the inquiry into a formal research. However, to read such a statement as the one under discussion is to understand why Freud has more to fear from his followers than from those who dissent from him.

The book has many virtues and has all the vigor and clarity of an oversimplified approach to problems which are still unsolved. Too many of the cases are taken from the newspapers and from poetry and myth. Certainly a case record, a newspaper account and a myth are not to be placed in the same category of proof or of illustration, yet this is continually done in the book. The most marvellous analyses are made of the quick and the dead who have never been examined at all, and with the same assurance as if they had been studied. It is time for a non-Freudian to protest in the name of Freud against this kind of psychoanalysis. If psychoanalysis is anything, it is a laborious, painstaking, technically correct, individual study, and when psychoanalyses are made in a few seconds on the basis of a newspaper account, a cheapening of Freud's technique and contributions takes place, which even the hardy non-Freudian reviewer resents.

This book will undoubtedly sell well and unquestionably has some value. Its main defects are that it over-simplifies and over-sells psychiatry. It happens that these are the great twin evils of present-day psychiatry.

A. Myerson, M. D.,
Boston.

Die Psychische Impotenz des Mannes. By *Edmund Bergler.* (Bern: Medizinischer Verlag Hans Huber, 1937.)

One can readily visualize the difficulties one is faced with in an investigation of psychic impotence. The condition is usually passed with silence or at the best is made the subject of anecdotes and jokes, and yet it must be borne in mind that psychic importance is responsible for a rather heavy suicide toll.

The author of this monograph is a member of the psychoanalytic ambulatorium in Vienna and has been investigating the problem of psychic impotence for a number of years. Together with his chief, Eduard Hitschmann, he previously published a monograph on frigidity in women. In the present volume Bergler deals with the problem of impotence in men from the psychoanalytic angle, admitting, however, the existence of purely organically conditioned cases. While the complexity of the problem and the unusual variety of types preclude an attempt at uniform prognosis, he nevertheless believes that the therapeutic results are not bad.

According to Bergler, the frequency of psychic impotence is extremely high. This may be explained by the fact that he makes the concept of

psychic impotence too broad. He includes, for instance, in this group the socalled half potent and the quarter potent, the cases with ejaculatio præcox, the aspermia cases, the changeable potence and individuals who react to sexual act with a feeling of disgust. The group is further enlarged by the inclusion of the ascets who abstain from sexual intercourse on all sorts of ideological grounds. To make the group still larger he adds the chronic masturbators and habitués of houses of prostitution. All these individuals are, according to Bergler, impotent in a larger sense of the word. He believes that without exception all these people are essentially neurotic; the impotence itself in these cases is not a disease *sui generis* but an accompanying symptom of a neurosis. He therefore suggests that the treatment should be directed against the underlying neurosis, that is against the anachronistic infantile sexual drives. This leads him to the discussion of the concept of sexuality in which he reveals himself as an adherent of Freud. He gives a rather lengthy classification of the various types of psychic impotence. There is the erective impotence, ejaculatio ante portas, ejeculatio retarda, psychogenic aspermia, etc. According to the degree of regression he distinguishes impotence with phallic, anal and oral mechanisms. There is further the true and the pseudo impotence.

Considerable space is given to the type of impotence in which the phallic mechanisms are at work. Here belong the hysterical type and the type which is conditioned by specific factors. In the hysterical type he sees the identification of the sex object with the mother with resulting fear of castration and desexualization and therefore the final inhibition and impotence. Among the cases in which impotence is specifically conditioned he singles out the type in which the bride-mother mechanisms are at work. He includes in this group individuals who seem to be able to fall in love with prostitutes only, men who though potent with their wives fail with other women and men who are in constant fear of impregnating the woman.

Bergler concedes that not every case can be helped with analytic treatment. In fact, he admits that analysis is not always *the* only treatment. Mild cases, for instance, can be helped by suggestion either in the form of talks or in the form of mechanical or medicinal applications. As mentioned already he recognizes the organic origin of impotence in certain cases, as in tabes and multiple sclerosis. He also draws attention to instances with disturbance in the function of the endocrine glands, cases in which analysis will be of little if any value. He also mentions the socalled borderline cases with a biologic basis in which only the psychic superstructure can be influenced by psychologic treatment. In these cases he suggests a trial of opotherapy.

These admissions of Bergler singles out his monograph from the ordinary run of similar publications. It is different, and here lies its superiority, because it is not blind to other possibilities without doing disservice to a chiefly psychoanalytically oriented study.

J. NOTKIN,
Poughkeepsie.

SIXTY-FIRST ANNUAL REPORT OF STATISTICS OF CRIMINAL AND OTHER OFFENCES FOR THE YEAR ENDING SEPTEMBER 30, 1936. (Ottawa: Dominion Bureau of Statistics.)

This report represents a summary of criminal and other offences in the Dominion of Canada for the year ending September, 1936, in addition to comparative figures for the years 1876 to 1936.

The report is presented in four parts, an introduction and an historical appendix. Part I deals with the indictable and non-indictable offences, Part II with juvenile delinquents, Part III the number of cases dealt with by the different courts, and Part IV miscellaneous items such as, penalties for burglary and robbery, police and prison statistics, pardons, executions, etc., including comparative figures for the years 1879 to 1936. The historical appendix gives comparative figures for the years 1876 to 1936.

The number of trials in Canada continues to increase, with 420,247 for the year ending September 1936 as compared with 402,148 in 1935, 366,152 in 1934 and 331,600 in 1933. There is an increase in both the number of indictable and non-indictable offences for the year 1936, with 42,541 indictable offences in 1936 as compared with 39,506 in 1935 and 38,927 in 1933, and 377,706 non-indictable offences in 1936 as compared with 362,642 in 1935 and 292,673 in 1933. There is an increase in the number of convictions for both indictable and non-indictable offences during the period 1933 to 1936—the year 1936 showing an increase over 1935 in convictions for indictable offences in every province with the exception of British Columbia, and an increase over 1935 in convictions for non-indictable offences in every province with the exception of Quebec.

During the ten year period 1927 to 1936 inclusive, the ratio of convictions to charges has steadily increased from 79.94 in 1927 to 84.76 in 1936, the ratios in 1935 and 1936 being just about the same. The greatest percentage of convictions as compared with charges is found in Saskatchewan where 10.3 per cent of all persons charged with indictable offences were convicted. The other provinces are, in order: Manitoba, British Columbia, Alberta, New Brunswick, Yukon and Northwest Territories, Quebec, Ontario, Prince Edward Island, and Nova Scotia.

The total number of criminals in Canada in 1936 was 29,063 as compared with 26,671 in 1932, with 3,371 persons convicted of more than one crime in 1936 as compared with 2,038 persons convicted of more than one crime in 1932. A smaller percentage of "first offenders" than has ever been noted is shown among those convicted for indictable offences in 1936. "Second offenders" comprise a larger proportion of those convicted than in 1935, while repeaters (those convicted on three or more previous occasions), comprise a higher percentage of convictions than is shown during the preceding five years.

Every one of the six classes into which indictable offences are divided shares in the increase of total convictions from 33,531 in 1935 to 36,059 in 1936. The classes with their increases over 1935 are: offences against the

person 472, against property with violence 694, against property without violence 861, malicious offences against property 53, forgery and offences against currency 184, and various offences 264.

Those convicted of indictable offences show a greater percentage sent to reformatories in 1936 than in 1935. Also a slight increase in the percentage of those sent to penitentiaries. There is a decrease in the number of persons fined, the number sent to common gaols, and the number given suspended sentences. The greatest number of persons convicted for indictable offences are unmarried, and by far the greatest proportion of them belong in the group who have had only an elementary education.

For convictions for non-indictable offences, there is an increase of 15,064 or 4.8 per cent in 1936 over 1935. Twenty-eight crimes of this class show increases in convictions during 1936, while twenty-one crimes of this class show decreases in convictions during 1936.

Juvenile delinquents are dealt with under two headings, those committing major offences and those committing minor offences. There is a marked decrease in the number of cases brought before the court during 1936 as compared with 1935. An increase of 3.5 per cent in minor offences are shown with 9.9 per cent decrease in major delinquencies. The proportion of repeaters is greater in 1936 than for any of the ten previous years. One of every three delinquents has been in court before, one of every seven has had one previous conviction and one of every six more than one previous conviction.

Of the criminal cases tried in 1936, 850 were tried by jury, 2,142 were tried without a jury and 33,067 cases were tried by magistrates. These figures are approximately the same as those of previous years.

Police statistics were collected from 161 cities and towns of "4,000 or over" population in 1936, with an aggregate population of 4,432,750 persons. An increase in convictions for Breaches of Opium and Drug Act is shown during 1936, when 182 persons were convicted as compared with 165 during 1935. This is the first time in ten years that an increase has been noted. The total number of cases in which the "Prerogative of Mercy" was exercised during 1936 was 1,495. There were eight executions during the year 1936.

The comparative figures for the years 1876 to 1936 indicate that in 1876 there was a total of 28,215 convictions for all offences or 714 convictions per 100,000 population as compared with 420,975 convictions for all offences or 3,817 convictions per 100,000 population in 1936.

MIRIAM WINSTON, M. A.,
Toronto.

A TEXT-BOOK OF MENTAL DEFICIENCY. Sixth edition. By *A. F. Tredgold, M. D.* (Baltimore: William Wood and Company, 1937.)

Eight years have elapsed since Dr. Tredgold's text for the student of mental deficiency was last revised. New material has replaced old, and a section has been added on the chronological development of the normal mind. It is well bound, has a content of 527 pages, a small appendix on developmental data and a series of good plates. The subject matter which is pre-

sented in 22 chapters covers the topics of concepts, etiology, classification, psychology, pathology, clinical types, examination, diagnosis, therapy, English law in respect to mental deficiency and the sociological problem.

That mental deficiency entails more than a low degree of so-called intelligence; that deficiency usually is not merely one of intelligence but also of other aspects of personality; that the ability of an individual to adapt himself to an average environment is a criterion of efficiency, are valuable concepts used throughout the book. A broad, pluralistic connotation is thus applied to the subject. To date there has been little agreement as to the true nature of intelligence, and until more is known it is best to evaluate so-called "intellectual" deficiency cautiously. This the author does.

The description of the clinical types is enhanced by plates and case presentations. This material is very adequate but for one noteworthy exception. There is included a long, well-constructed case history of an idiot savant, which, in the opinion of the reviewer, belongs not in a text, but in a separate publication, due to the fact that the case is exceptional and emphasizes a rarity, thus destroying the balance of this section.

The chapter on the psychology of the mentally deficient begins with a discussion of the psychology of the normal individual. This part of the writing could be improved. The author speaks of "mind" and discusses this under the headings of conative, affective, and cognitive processes. Throughout the context one is impressed, probably because of the frequent reference to "mind" and its faculties, that the "mind" is held to be something quite separate from the "body." In light of present day thinking it would be more instructive if the chapter dealt with personality from a structural or dynamic, behavioristic standpoint or both. The author does speak of the "totality of self" and of "the mind as a whole," (p. 107.) In general, psychobiological concepts are not closely adhered to. The use of formalistic and nominalistic phrases, such as, weak in character, feeble in will, and feebleness in personality and character, lead to confusion and misinterpretation. These terms are antiquated, static and represent a lag in popular knowledge.

Chapter 18, which is concerned with tests of various abilities, is instructive. Tests of scholastic attainments, tests of "common sense" knowledge and serial tests including tests of specific abilities are described. There is the noticeable omission of the Rorschach test, which is not only of value in the measurement of ability but also gives other data of equal importance.

Contrary to the feeling of some physicians, the mentally deficient are in need of and benefit by therapy, not only medical and surgical treatment, but therapy in terms of training of all functions to the maximum degree. The chapter on therapeutics is far from being fatalistic in temper. One imagines that the author would have liked to write much more in the closing chapter upon prevention and the sociological problem since popular interest in this is keen. Briefly and concisely he discusses segregation, sterilization, national marriage laws, contraception, euthanasia and the pros and cons of application. He takes a firm, progressive stand, which cannot be called reactionary or alarmist. To quote: "So long as the nation is content to raise no voice against the marriage of the diseased, the degenerate, the

habitual criminal, and the chronic pauper, and is willing to educate, feed, clothe and maintain as many offspring as these persons see fit to produce; so long as legislation is permitted a free hand in doing everything calculated to diminish parental and personal responsibility and to strike at the very root of any incentive to labor; insofar as our law-makers and would-be philanthropists are blind to the folly of transferring the burdens and penalties inevitably following carelessness, improvidence, indifference, and inefficiency, from the shoulders of those upon whom they should rightly fall to the careful, provident, and industrious members of the state—then so long will the classes characterized by these antisocial qualities continue to be perpetuated, and the numerical ascendancy is simply a question of time."

This text-book is intended for the use of all students of mental deficiency, but due to the fact that it is couched in terms of English law and thought, it is certainly more valuable to the Englishman. The book is recommended as the best text on this subject to date.

JOHN W. EVANS, M. D.,
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BIOLOGICAL TIME. By *P. Lecompte du Noüy*. (New York: Macmillan Co., 1937.)

The author has divided the material in this book into three sections. Part I, The biological problem and methods, consists of a review of the principles of research according to Claude Bernard. Extensive quotations are used, and examples of the successful utilization of these methods in modern research are interspersed here and there. The author makes considerable effort to simplify and to explain in detail the various terms involved. This material is obviously designed for the layman and seems inappropriate in juxtaposition with the subsequent more technical and abstruse sections.

Part II, Cicatrization of wounds and tissue culture, contains a review of the author's work in this field. A considerable part of this work was done at the Rockefeller Institute in New York City under the direction of Alexis Carrel. Carrel is presented as the modern equivalent of Claude Bernard. The story of the tissue culture work, including the chicken heart that lives forever, is reviewed. It is shown that the studies on wound cicatrization in relation to age fit in very nicely with the growth index which can be deduced from Carrel's experiments with tissue cultures. The index of cicatrization was obtained from extensive study of the rate of healing of various sorts of wounds in patients of different ages. The growth index was obtained by measuring the duration of life in vitro of fibroblasts grown in plasma derived from animals of different ages. This work dramatically illustrates the profound difference between physiological time and sidereal time. It seems probable that some modification of the methods described by the author may eventually be useful in the study of patients.

In Part III, Time, the author takes up various definitions of time and then goes on to show how differently people of different ages evaluate time. For example, a child finds the day and the year very much longer than does the

adult. This observation fits in very nicely with the difference in the rate of wound healing between the child and the adult. A given wound in a child of ten will heal four times faster than a similar wound in a man of 50. The author concludes that this difference in rate and activity of skin cells probably applies roughly to the other cells of the body. He points out that a child of ten goes through more daily activity in the psychological field than does the adult. He suggests that the difference may be similar, quantitatively, to that found in the plane of activity of the skin cells. The adult's experience that the years are extremely short is due to the slowing up of the rate at which the cells of his body are able to work. Upon reaching this conclusion, which is based upon quite convincing experimental data, the author launches forth into some intriguing speculation. He touches briefly on the nature of reality, on Bergson's concepts, and finishes off with Plato and some of the mathematicians.

In conclusion, the author admits that much of the material he has presented may be questioned and that many of his ideas are controversial. He feels, however, that the material is worthy of presentation, even in this incomplete state. The chief virtue of this monograph lies in the fact that a difficult field is explored and that although the results may be questioned it should inspire further work along similar lines.

EDWIN F. GILDEA, M. D.,
New Haven.

OUR CHILDREN IN A CHANGING WORLD: AN OUTLINE OF PRACTICAL GUIDANCE. By *Erwin Wexberg, M. D.,* and *Henry E. Fritsch.* (New York: The Macmillan Co., 1937.)

According to the author's preface, this book was written "for the purpose of providing parents and teachers with a concise review of the most common problems of childhood development and of their solution by modern educational psychology." It contains 232 pages and is written in simple, nontechnical language, easily understandable to the average layman. The approach is essentially that of individual psychology.

The actual content of the book is divided into three main parts: General Problems, Special Problems, and Educational and Corrective Measures. The first section consists of a general discussion of the origin of childhood difficulties as formulated by adherents of the Adlerian school. Under the heading, "The Five Factors of Environment," the author gives short summaries of the following topics: The Physical Condition of the Child, Social and Economic Environment, Sex, The Family Constellation, and Education.

The second part of the book opens with eight chapters devoted to categorical types of problem children, entitled as follows: The Bad or Criminal Child, The Lying Child, The Over-ambitious Child, The Model Child, The Timid Child, The Fearful Child, The Lazy Child, and The Stupid Child. This series of short chapters consists of excerpts from typical case studies, with interpretations according to accepted Adlerian formulæ. In subsequent pages, special habits and symptoms such as thumbsucking, stammering, bedwetting and masturbation are briefly discussed.

The third division, consisting of but 29 pages, sketches the Adlerian therapeutic approach to such miscellaneous problems as weaning, screaming, walking, speech, table manners, criticism, punishment, and rewards. In concluding, the author stresses the following four objectives as of paramount importance relative to the education of the child: Independence, Courage, a Sense of Responsibility and a well developed Social Feeling.

As a sincerely written contribution to the popular literature on child hygiene, presented simply and directly from the point of view of the individual psychologist, the book should be helpful in introducing the general reader to this approach.

L. E. HIMLER, M. D.,
Ann Arbor, Mich.

ANNUARIO DELLA PONTIFICIA ACCADEMIA DELLE SCIENZE. I. 1936-1937. (Pontificia Academia Scientiarum, Citta del Vaticano, 1937.)

This imposing volume of approximately 850 pages is the first year book of the new Pontifical Academy of the Sciences, which was established by His Holiness Pius XI, October 28, 1936, succeeding the old *Accademia dei Lincei*, which was founded in the seventeenth century.

The bulk of the present volume is given over to biographical sketches with bibliographies of the academicians of the several ranks, the total number being eighty (five honorary pontifical academicians, seventy pontifical academicians and five pontifical academicians supernumerary). Each biography is accompanied by an excellent portrait of the academician with facsimile signature. These biographies are arranged alphabetically, the list of active academicians beginning with Abderhalden and ending with Zeeman. They include Protestants as well as Catholics, and among them are various Nobel Prize winners. Italy contributes 33 of the 70 members, the United States 6, Belgium, France and Germany each 5, the Netherlands 4, Great Britain 3. Argentina, Austria, China, Czechoslovakia, Denmark, Norway, Poland and Portugal are also represented. Notable among the Italian members is Senator Vito Volterra, formerly professor of mathematical physics and celestial mechanics at the University of Rome, who was removed from his post by Mussolini in 1931 when he refused to take the oath of allegiance to fascism.

The American academicians are: Dr. George D. Birkoff (Mathematics, Harvard), Dr. Alexis Carrel (Biology, Rockefeller Institute for Medical Research), Dr. Robert Andrews Millikan (Physics, California Institute of Technology), Dr. Thomas Hunt Morgan (Biology, California Institute of Technology), Dr. George Sperti Speri (Anthenaeum of Ohio, Cincinnati), Dr. Hugh Stott Taylor (Chemistry, Princeton). It is noted that the name of Millikan is included but not those of Eddington or Jeans; the name of Einstein is also missing.

The biographies are prefaced by the Pontifical proclamation creating the Academy, the statutes and constitution under which it functions, a history of the Academy and its antecedents and a description with photographs of its physical site in the Vatican gardens.

C. B. F.

In Memoriam.

ALFRED ADLER.

1870-1937.

On May 28, 1937, Dr. Alfred Adler died suddenly and unexpectedly while on his way to deliver a lecture in Aberdeen, Scotland. He was one of the pioneers of analytical psychology and the founder of Individual Psychology. In him medical science loses a great contributor to the understanding of human nature and a fighter for the prevention and cure of neuroses and psychoses.

Born in 1870 in Vienna, the second son of a large family, Dr. Adler grew up a sickly child, a factor which, according to his own statement, was to a large extent responsible for his decision to become a physician. After finishing his preliminary studies he entered the medical school of the University of Vienna and graduated in 1895. He did some postgraduate work under Krafft-Ebing, specializing, however, in ophthalmology, and practiced general medicine for some time before he returned to his primary interest, psychiatry.

During his adolescence Dr. Adler became interested in social and economic problems and, while studying medicine, in the influence of these factors on human ills. His first publication, which appeared in 1898, dealt with *Occupational Diseases of Dressmakers and Tailors.* In the introduction to this little book he stated that he " regarded man not as an individual product, but as a product of society."

At the turn of the century Freud began to publish his theories on psychoanalysis and we find Dr. Adler among the first to become interested in this aspect of medical science. He soon won prominence in this—at that time still a small group—when he published in 1907 his book: *Organ Inferiority and Its Psychical Compensation.* In this book which was well received by other branches of medicine, Dr. Adler investigated the organic basis of the psychological superstructure of organic illness as well as the influence of inborn organ inferiorities on the formation of character.

Considering his earlier interest in the interrelation between the individual and society it is not surprising to find that Dr. Adler's attention soon became focused on the social aspect of psychoanalysis. Under the influence of Nietzsche's conception of the "Will To Power" Dr. Adler wrote a paper: *Der Aggressionstrieb im Leben und in der Neurose* (The Aggression Drive in Life and in Neurosis) which appeared in 1908 in *Fortschritte der Medizin*. In it he made a series of valuable contributions concerning the reaction formation of instinctual drives, yet he attributed to the aggression drive nearly all the characteristics Freud had propounded in his libido theory. Already at that time Dr. Adler subordinated sexuality and its various expressions under the predominance of the aggression drive.

Having come to these conclusions the break with the psychoanalytic group was in the offing and became definite in 1912 with the publication of his book: *The Neurotic Constitution*. The theories of Individual Psychology had taken shape.

Dr. Adler assumed that the striving for significance is the sole driving power of the individual, moderated only by his social feeling under the influence of culture. The more inadequate an individual feels the higher he feels himself compelled to establish his goal of superiority, however mistaken or subjective this feeling of inferiority may be. The style of life—formed between the fourth and fifth year—remains the same throughout the life of every individual, normal or abnormal, and he pursues his goal of superiority, unknown to him, along his individual, fictitious life line. Character changes he explained on the basis of the same goal pursued by changed means.

The difference between the normal and abnormal personality was for Dr. Adler the creation of the goal of superiority in the useful side of life for the normal, and in the useless side for the abnormal person. Character qualities and neurotic symptoms are means of security to insure this fictitious goal and to protect the individual from real or feared defeat. The further away this life line deviates from common sense the further will the individual remove himself from normality. Neurosis, psychosis, alcoholism, drug addiction, criminality and suicide are explained along these lines. All functions of life and all instinctual drives are in the service of this striving for significance. Dr. Adler did not accept

the conception of the Unconscious although he states that "the individual knows more than he understands."

When Dr. Adler parted with psychoanalysis a number of men followed him several of whom were educators. As the result of their new orientation there appeared in 1914 a symposium: *Heilen und Bilden* (Curing and Molding) in which valuable investigations were made in regard to the influence of the environment on the development of character. Children with organ imperfections and spoiled and neglected children were found to be the ones who most easily seek their goal of superiority in the useless side of life.

In 1922 Dr. Adler finally formulated his theories in the book: *Theory and Practice of Individual Psychology.* His later publications deal mainly with the application of his findings to psychotherapy, education and everyday life. He organized school clinics for problem children and advisory councils for children and adults. His special interest in the problem child was aroused when he saw the detrimental influence that the War and the period immediately following it had on the morale and emotional development of youth. His books appeared in many editions and were translated into several languages; study groups were formed and clinics established in many towns and cities in Europe.

In the spring of 1925 Dr. Adler accepted an invitation to give a series of lectures in the United States, and from this time on he spent a part of each year in this country until he made it his home in 1935.

In the summer of 1929 the first Individual Psychological Clinic was opened in one of the Vienna hospitals and in the fall of 1929 he taught and held a clinic at the Vanderbilt Clinic in New York City. In 1930 he taught at the extension division of Columbia University, and in 1932 he was made professor of medical psychology at the Long Island Medical School in New York, where he also conducted a mental hygiene clinic, assisted in this work by several coworkers. He worked there until his death in 1937.

In 1914 he founded the *Internationale Zeitschrift fuer Individualpsychologie,* and in 1935 the International Journal of Individual Psychology was founded in America, with Dr. Adler as the editor-in-chief of both journals.

His love for children and for suffering people were his outstanding characteristics and he liked to give encouragement to

the weak and to the beginner. His belief in and cooperation with people, as the best remedy against tension in human relations were outstanding qualities in this indefatigable scientist. He was a devoted husband and father and in his rare, free moments he liked to attend to his garden and enjoyed listening to good music.

His main objective in life was to correct the mistaken interpretation people give to life and to themselves; he tried wherever he could to raise or restore the damaged or lost self-esteem of the individual. The main activity of his later years was an expression of the man rather than the scientist: to bring his theories to as many people as possible in order to prepare the way for the prevention of neuroses or other forms of maladjustment, an aim which every physician finally considers more important than cure.

How much of Dr. Adler's theories will become an integral part of medical psychology rests with the future. A considerable part of his conceptions have already penetrated into common knowledge and the understanding of human nature. Dr. Adler will always be remembered as one of the few who opened the way for modern psychotherapy and progressive education.

OLGA KNOPF, M. D.

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HABEAS CORPUS RELEASES OF FEEBLEMINDED PERSONS AND THEIR CONSEQUENCES.

A Follow-Up Study.*

By LEO KANNER, M. D., Baltimore.

The writ of habeas corpus is one of the major guarantees of individual freedom. It is rooted in the Magna Carta and provides a redress for any person detained against his will in a prison, institution, hospital or any other place. It requires the body of a person alleged to be unlawfully restrained to be brought before the judge, that the lawfulness of the restraint may be investigated and determined. The writ is addressed to the man or woman in whose custody the detained individual is held and orders him or her to produce the body before the court and there state the cause and warrant for the detention.

In the State of Maryland a writ may be heard before any judge sitting at law during his term of office, regardless of the legal residence of the detained person, the city or county from which he has been originally committed, and the location of the place of confinement. In theory there is no limit to the number of writs that may be filed concerning any one individual. Once a writ has been issued, the judge is under obligation to set a date for the hearing. He may release an individual if he finds him to be restrained illegally or remand him to his place of custody if the detention is proved to be in accordance with the law.

The habeas corpus procedure is of particular interest to psychiatrists in that it can be, and often has been, applied to persons kept in institutions maintained for the care of psychotic and mentally deficient individuals. This study deals with the circumstances under which patients were released on writs from the Maryland State Training School for the Feebleminded, referred to hereafter as the Rosewood School or Rosewood, and with the destinies of these patients from the time of their release to the present date.

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

Every statement made in this report is based on documentary material, information from social agencies, marriage licenses, birth and death certificates, Social Service Exchange data, court records, case histories of the Rosewood School, public school and hospital notes, the results of psychiatric examinations and psychological tests, and personal visits paid to the homes of the patients themselves by an experienced and thoroughly reliable social worker engaged especially to assist in this investigation (Miss Mabel F. Kraus).

One hundred and sixty-six patients were released from the Rosewood School on writs of habeas corpus between 1911 and 1933. Only 15 were males and 151 were females. Five persons were released twice, so that the whole number amounts to 171. A total of 24 judges were instrumental in issuing the court orders. But while 18 of the judges decreed the removal from the Rosewood School of less than 5 patients each and of 33 altogether, the remaining 6 judges were responsible for not less than 138 releases. The record goes to Judge X who had 81 to his credit; the next highest number attributable to one judge is 21; the third highest is 12.

The annual distribution of the releases was as follows:

Year.	No. of releases.	Year.	No. of releases.
1911	2	1923	25
1912	1	1924	23
1913	0	1925	1
1914	1	1926	2
1915	2	1927	3
1916	2	1928	3
1917	1	1929	7
1918	10	1930	1
1919	20	1931	3
1920	35	1932	5
1921	10	1933	1
1922	13		

Though approximately one-half of the 166 patients had been originally committed to the Rosewood School from the counties and one-half from Baltimore City, only 25 (15 per cent) release orders were issued by county judges and all the others (85 per cent) by city judges. White patients only are cared for at the Rosewood School.

In 14 instances, the writ releases were preceded by court hearings in which a writ had been issued but the judge did not feel justi-

fied in removing the patient from the Rosewood School to which the patient was "remanded." This happened, for example, to Elsie A. who had been at the school since 1906; in 1918, a Mrs. Maggie K. wanted her released. She did not know the girl at all but learned that a small sum of money had been left to her by her parents. She found a lawyer who filed a petition for the writ but Elsie was remanded. Two months later another judge released her to her brother who mistreated her brutally. Judge XI remanded Solomon B. in 1914. Upon leaving the court room, Solomon's father attempted to abduct the boy. He hired a lawyer who wrote a threatening letter in which, among other things, he said: "I can, if necessary, produce a number of alienists and men in the medical profession who are strong in their hope that this child would be better off under the supervision of his natural parents than he would be where parental care is necessarily distributed over so many." Judge XII released the boy in 1915 to his "natural parents" who proved so unnatural that they threw him out of their home. Solomon is an unemployable vagrant who has had several acute gonorrheal infections which he has gone on spreading *ad libitum*. Lawyer I tried to have Elsie C. released in 1919 to a woman who wanted her for a housemaid. The judge remanded her. The lawyer did not give up and had her released by Judge X in 1921, over the protest of the school, the probation officer of the Juvenile Court that had committed her to Rosewood and the girl's own mother. Lawyer II did not succeed in removing Mattie F. on a writ. Lawyer I took up her case and had her released by Judge X in 1923. Mattie had two illegitimate children who are feebleminded and placed in an orphanage, and she herself, after serious maladjustment, was placed at St. Vincent's Home where she still resides. In 1924, a judge refused to release Edna May H. to her alcoholic brother, the husband of an alcoholic and psychotic woman. The same judge released her four months later to a woman who wanted a maid. Edna May became a prostitute and, at least on one occasion, had sexual intercourse with her own brother in a hotel where they registered as man and wife. When she married in January, 1925, the judge called the couple to his chamber, gave them his blessings and released Edna from the court's "supervision." They have four feebleminded, neglected, malnourished children who are often covered with scabies and live in dirty, vermin-infested quar-

ters. Elizabeth B. was remanded on two occasions (in 1920 and 1924) before Lawyer I managed to have her released in 1931. The release promptly started her out on a career of prostitution.

The knowledge of these cases in which patients were first remanded and then released is of particular significance because they demonstrate to what extent the judges' opinions about the lawfulness or unlawfulness of the patients' detention at Rosewood have differed. They make one wonder about the possible criteria that prompted the judges' decisions. To our knowledge, the question of the legality of the original commitment and the technicalities connected therewith has never been raised at any hearing. Social considerations were far removed from the judges' minds, as this study will demonstrate. In one case only is there a direct indication of the train of thought that led a judge to reach his conclusions:

Dorothy J. was admitted in 1912 to Rosewood, where her sister Bertha joined her in 1921. Dorothy's I. Q. was 57, Bertha's was 45. Lawyer II desired to have both girls released on a writ to the custody of their half-sister. He wrote insolently threatening letters to the superintendent, who was aware of the dangers involved and kept explaining and pleading. Nevertheless, on December 21, 1925, Dorothy was released while Bertha was remanded. The judge based his decision on the girls' knowledge of the multiplication table. He said that Dorothy, then 23 years old, would not likely get it as she was older but Bertha should remain at Rosewood "to study the multiplication table." But their half-sister had really wanted Bertha and only applied for both girls to be sure that she would get Bertha. When she did not get her because of the multiplication table complication, she did not want Dorothy but was persuaded to take her. Dorothy married in 1927 a member of a notoriously feebleminded and socially dependent family, has accumulated six feebleminded children, of whom two are dead, and lives in a filthy, unfurnished two-room shack. Bertha, seeing her sister depart from Rosewood, did not wait for mastery in multiplication and several times attempted to escape. In one of her attempts she fell from a third story window and broke a leg. In 1930, Lawyer II wrote another threatening letter demanding her immediate release. He kept agitating Bertha, who made her final escape in October, 1931, married a feebleminded, shiftless man who had run away from a reforma-

tory, has two children, of whom one is an idiotic cripple, and lives in a filthy, malodorous one-room shack.

How indeed can one unfamiliar with the intricacies of the law fathom the fine points that must have been involved in the case of Victoria V.? Victoria was admitted to Rosewood in 1913, coming from a boarding home of the Children's Aid Society. Lawyer I, wanting her as a maid for one of his clients, persuaded her brother Charles to let him petition for a writ. Judge X released her early in 1919. This seems to mean that he considered her detention unlawful. Thereupon Judge XIII, apparently deciding that her detention was lawful, remanded her to Rosewood. Thereupon Judge X, indicating that he still regarded her as being unlawfully detained, released her again in July, 1919, to her brother Charles. Charles was a feebleminded, brutal, unemployable drunkard, a reform school graduate, who had deserted his wife and children at the time when Victoria's release was granted. Victoria became a prostitute and later died of tuberculosis. The law had no objection to that.

In not less than 73 of the 166 cases under consideration, the Maryland courts, and more especially the Supreme Bench of Baltimore City, were allowed to function as employment agencies for domestic servants. They were most inefficient agencies at that. In our last so-called era of prosperity housemaids were relatively expensive. Lawyer I of Baltimore and a number of " society matrons " concocted a nightmarish scheme which was to provide the matrons with cheaper help. The lawyer managed to obtain the names of Rosewood girls who did useful work at the Training School. He did not realize that at the school the girls were apportioned occupations which both in their amount and quality were adapted to their physical and intellectual capacities. The fact that they were occupied at the school was enough to regard them as potential domestics. Lawyer I, his office associates and three other attorneys who soon joined the sport filed a writ for each girl *without her knowledge*. The girls, who had resided at the school from 5 to 30 years, had no thought of leaving. They were well treated, had a permanent home and were not suited for extramural existence. They knew nothing about the writs until the day when, by order of the court, their " bodies were had " for the hearing and they found themselves " released to the custody " of women

whom they did not know and who did not know them. In most cases, the lawyer-matron combine did not even bother to get in touch with the girls' relatives. It often happened that many months after the release relatives of the girls wrote to the school inquiring about their conditions, not knowing that a meddling lawyer and an obliging court had sent them into private domestic service. When the relatives were in closer contact with a Rosewood girl, Lawyer I went to them, told them a tale of the inmate's poor care at the institution and sang hymns of praise of the beautiful home which he had found for the girl. He thus contrived to obtain the relatives' consent. He also combed the court's records for names of Rosewood girls who had previously been brought before a judge on a writ through the efforts of their parents or siblings but had been remanded to the school. Lawyer I then filed a new petition for a writ and had the girls turned over to his maid-seeking clients. Most of his cases were heard before Judge X, who never failed to oblige him, even in the cases of patients whom he himself had previously refused to release on a writ of habeas corpus. Lawyer I had his hand in not less than 53 releases from Rosewood.

Usually, though not always, the lawyers wrote to the late Dr. Keating, superintendent of the Rosewood School, before petitioning for a writ. They demanded the release of a certain girl without giving an adequate reason for their demand. Dr. Keating gave a report of the girl's condition and invariably brought the matter to the attention of the board. Often, after careful sizing up of a girl and the situation, Dr. Keating and the board found it sufficiently safe to parole her from the school. A writ was not needed under the circumstances. In all instances in which writs were filed, it was done against the express advice of Dr. Keating and the board. Lawyer II often accompanied his demand for the discharge of a girl with an insolence not worthy of a professional man. Even after a few of the girls, utterly incapable of getting along on the outside, had been remanded to Rosewood, even after Lawyer I had given them up, Lawyer II got busy and sometimes annoyed Dr. Keating for two or three years, eager to return those girls into circulation.

With four laudable exceptions, the women who took the released girls into their homes had no understanding of the functions of the Rosewood School, not the slightest knowledge of the personalities

of the girls nor any interest in improving their situation. The worst offender of them all had peculiar misconceptions about the training school which she regarded as something like a dungeon into which poor innocent girls were thrown for lifetime in punishment for something of which they were not guilty. This woman, who had Lawyers I and III take out for her not less than 35 Rosewood girls, was not even capable of training her own children. She had a small girl who had fierce temper tantrums and was allowed to beat and kick the Rosewood girls, spit in their faces and upset their buckets when they were scrubbing the floors. If the girls protested, they were simply fired, and the lawyers got other girls for her on writs of habeas corpus. Another woman tried out several Rosewood girls in succession, keeping them for a few days or weeks only, until finally she found one that suited her tastes. Many of the women soon became dissatisfied with their maids and expressed great astonishment that the girls seemed "stupid" and "slow"; this discovery, however, did not deter them from ordering another girl from Lawyer I when they got rid of the one they had. A few of the women so overworked and underfed their imbecile maids that several of them died within two or three years after the release, mostly of acute pulmonary tuberculosis. One girl who was placed in the home of a physician under his wife's supervision was so poorly supervised that she went through nine months of an illegitimate pregnancy and gave birth to a child without anyone noticing it; the "supervising" wife of the doctor knew nothing of all this until she found the newborn baby in her cupboard. One woman ordered and obtained through a court of justice a Rosewood girl whom she intended to keep for two months only, discarding her when she and her family left for an anticipated pleasure trip to Europe. Another woman scolded, punished, and otherwise mistreated an imbecile girl for whose release she was responsible because "instead of belonging to the animal kingdom she was but a vegetable." A woman had Lawyer I take out a girl for her on a writ, accepted her at the court hearing and turned her loose the minute they left the court room. The same woman took another Rosewood girl, who after two days came to the judge begging him to send her back to Rosewood. She stated that she had not known that she was going to be removed from the school, had had no thought of leaving it, and that the woman was abusing her. She was

happy when she was allowed to return to Rosewood. One year later, the woman whom we designated as the worst offender had a petition filed before another judge, who released the girl to that woman, thus starting her out on a pathetic career of being tossed between many unsympathetic women. In the years between 1920 and 1924, the practice of obtaining maids on writs from Rosewood was especially fashionable in the Catonsville and Forest Park suburbs of Baltimore.

Some of the girls received no wages whatever. In all other instances the wages paid were far below the average earnings of housemaids. The amounts were left entirely to the mood of the mistress, and in a number of cases the girls were left totally ignorant of the size of their wages which sometimes consisted of occasional small pocket money for candy and movies.

When the girls were released to the maid-seeking matrons, it was the custom that they were placed under the informal supervision of Miss B., Miss D., or Miss M., probation officers of the Juvenile Court of Baltimore City, social workers of the highest type. Often, however, these workers and the Juvenile Court were not even notified of this stipulation which thus remained a meaningless gesture. In one case, Miss D. did not learn of the fact that one of the girls had been assigned to her "supervision" until several years later when a social agency looking up the court record discovered an entry to that effect. The supervision clause itself meant very little. The probation officers knew very well under what circumstances the girls had been released. They realized that the girls should have remained at Rosewood. All they could do was to make visits to the homes and inquire about the girls. If a girl failed to adjust to a home or a home failed to adjust to a girl, the probation officers were called and, against their better judgment, were forced to place her in another home, thus unwillingly becoming links in the employment agency chain. They had no right to return the girls to Rosewood. Dr. Keating had no right to take them back, even though a girl may have been a prostitute and a spreader of syphilitic or gonorrheal infection. Every released girl remained under the jurisdiction of the releasing judge.

Eighty-nine of the remaining 93 patients were released on writs of habeas corpus on the petitions of their relatives. Nothing can possibly give a better picture of the type of persons to whom they

were released than the recital of examples: Three children of feebleminded, irresponsible parents were admitted to Rosewood in 1917; in 1920, Judge X released them to the custody of their imbecile, irrational aunt who lived in utmost poverty. The children were not fed nor clothed properly, were beaten brutally, and ran away on several occasions. One of the children, Ruby, had the good fortune to be returned to Rosewood in 1925, while the other two were removed from their aunt after an investigation by the Society for Protection of Children from Cruelty had disclosed hair raising facts about the brutality of the aunt and her husband. In 1929, Judge XIV did not hesitate to send Ruby back on a writ to this couple. Ruby luckily ran away from them after a few days. Roland A. was committed to Rosewood by Judge XI on October 7, 1924. Roland's father was a habitual drunkard, had fierce temper tantrums, and mistreated his family. Roland's mother was a feebleminded woman who never kept house for the children, one of whom was removed from the parents in 1921 after an investigation by the S. P. C. C. The same Judge XI returned Roland on a writ to these parents exactly 13 days after he had committed him to Rosewood. Roland went back to a filthy, ill-smelling place and a group of chronically dependent people. Florence G. was released on the petition of her brother Allan who had run away from Rosewood and married a notorious prostitute. Mary G. was turned over to her sister, in "custody" of her brother-in-law who immediately gave her an illegitimate child that is feebleminded and now herself a patient at Rosewood. Alberta M. was a feebleminded sex delinquent at the time of her admission to Rosewood in 1915. Her mother, married four times to shiftless drunkards, was an immoral, degraded imbecile. When this woman tried to take Alberta out on a writ, Judge XI ordered an investigation. The home was reported as crowded, filthy, located in the slums. Dr. Keating and a pastor who knew the family warned against Alberta's release. Judge XI, with all these facts before him, released Alberta to her mother in 1918. Alberta walked the streets as a prostitute, gave birth to four illegitimate children, married an imbecile cripple who deserted her after a few weeks, was alcoholic and literally picked up drunk from the gutters, and committed twice to the Spring Grove State Hospital, from which after her first admission she was released on a writ to her delinquent brother who had just emerged from a

correctional institution. Anna R., the daughter of alcoholic, cruel, feebleminded, delinquent parents, came to Rosewood in 1930, at the age of 14 years, having an I. Q. of 47 and a history of prostitution. Eleven months later, Judge XI returned her on a writ to her parents. A lawyer had assured Judge XI that home conditions had so improved "as to be all desirable for proper training of a young girl." This assurance was contrary to the expert opinion of Dr. Keating, contrary to a plea of a justice of the peace on behalf of his community, contrary to urgent pleas of several responsible citizens of the small town where the parents lived, and above all contrary to facts. Judge XI was more impressed by the lawyer's glib misrepresentations than by the real facts. Anna promptly was alcoholic, sexually promiscuous, and a thief and is now serving a one-year sentence at the Maryland House of Correction. Rebecca A. was released twice on the petition of her feebleminded, syphilitic, sexually promiscuous mother; she acquired syphilis, attempted suicide, gave birth to seven children from different fathers and married first a syphilitic criminal and then a post-encephalitic cripple. Ethel B. was released to her brothers who have I. Q.'s of less than 60 and records of larceny, burglary and vagrancy. Solomon B. was turned over to his father who soon afterwards threw this imbecile, athetoid boy out of the house because he was unable to learn the trade of a watch repairer. Ella C. was released by Judge XV to her alcoholic, mentally deficient, immoral, brutal father whose wife had died as a result of his cruel ill-treatment and who had deserted his children; at the time of Ella's release by a court of justice, the father was living with a woman and her four grown children, all of whom were notorious prostitutes; both a lawyer and a physician had recommended Ella's release to her father's care. Ella promptly joined the promiscuous behavior of the group. She has had three feebleminded children. Mary Louise D. was sent to the custody of an uncle who lived in a filthy, miserable shack in the worst slum district; she became a notorious prostitute and remained so after her marriage to a feebleminded drunkard. Bertha C., an imbecile prostitute, was sent to Rosewood in 1917 by Judge H. of Harford County. Judge X of Baltimore released her in 1920 to a cousin, who, according to Lawyer III, wanted to "support, maintain, protect, and look after" Bertha. Dr. Keating and Judge H.

had in vain implored Judge X not to release her. The cousin did not prevent Bertha from resuming her prostituting activities immediately after the release. Ellen W. was released by Judge XIV to the "custody" of her father who, according to his lawyer, "could prove suitable care" but in reality was an irresponsible man and never properly cared for his children, so that they had to be placed in boarding homes by the Children's Aid Society. No sooner had they left the court room than the father refused to take her into his home. Ellen became a prostitute, had an illegitimate child, married its alcoholic and syphilitic father, had another child, was deserted by her husband, and continued prostituting herself after her feebleminded children were placed in an orphanage. Judge XIV, urged by the social agencies to send her back to Rosewood, said that his jurisdiction had ceased at the time of Ellen's marriage and that he needed the consent of her husband, whose whereabouts were unknown, before he could send her back to Rosewood. Ellen was committed by two psychiatrists to the Spring Grove State Hospital. Elsie A. was released to the "care" of her brother who just then was neglecting his own wife and children and living with another woman whom he had impregnated. Clara S. was turned over by Judge X to her sister Eva who had an illegitimate child, was sexually promiscuous even after her marriage and soon after Clara's release deserted her family to indulge openly in prostitution. Viola W. was released by Judge XIII to her mother, a feebleminded prostitute, widow of a drunkard who was killed by a man with whom she was living in adultery after she had abandoned her children and allowed them to be placed in boarding homes of the Children's Aid Society. This woman within a short time initiated her own daughter, released to her custody by a court of justice, in the practice of prostitution.

It was not necessary that a relative or a maid-seeking matron apply for the release of a Rosewood inmate. Anyone who called himself or herself a "friend" was considered sufficiently qualified. Thus Bertha H. was turned over to a woman who, being too lazy to do her own housework, thus hoped to have her "friend" Bertha do her work for her. She discovered that Bertha was not quite so capable as she had thought and caused the judge to return her to Rosewood after two weeks. Frank P. was returned to his foster mother who had him sent to the school just two weeks previously

after he had set fire to a house and a barn. Frank, within the two years following, set fire on at least 12 occasions to the wood house and barn and was finally remanded to Rosewood. Jessie S. was released to a woman who had given her shelter when she ran away from the school. Marie S. was handed over by Judge XIV to a low grade feebleminded woman, the mother of a young man whom she wanted Marie to marry.

We were interested in the reason why the number of habeas corpus releases dropped suddenly from 23 in 1924 to only one in 1925 and not more than seven in any year after that. We learned from the Rosewood records that, whenever a writ was threatened by a lawyer, Dr. Keating made a careful study of the situation, paroling a patient if he felt that he could do so safely and urging that a patient be permitted to remain at Rosewood if he felt his or her removal would seriously conflict with the safety of the patient and the community. He sent urgent and eloquent pleas to the lawyers and judges, basing them on facts concerning the patients' personalities and past behavior and the dire probabilities that lay ahead of them in the event of their releases. Dr. Keating's reports were admirable masterpieces of patience and restraint in the face of his sad experiences of being completely ignored again and again. One suspects that he had learned to treat the lawyers and judges as erring children who did not know better. For years he tried to educate them. But finally, in 1924, even Dr. Keating gave up in despair. Finding his efforts wasted on an uneducable group of men, tired of the agonies that he had to go through at every hearing, he decided to capitulate. When a lawyer asked for a patient's release, he discharged the patient without waiting for the distasteful formality of the hearing. Hence the lawyers petitioned for no writs of habeas corpus, and the number of writs dropped considerably. Occasionally, however, there still remained cases in which even after the capitulation Dr. Keating raised his warning voice, but the judges went on disregarding him as they had always done.

It has been possible to secure detailed information about the family background, early development, condition at the time of commitment, progress during the stay at Rosewood School, and the circumstances connected with the habeas corpus release of every one of the 166 persons released. In 102 of the cases, 94 girls and

8 boys, additional knowledge could be obtained about the patients' life destinies from the date of the court hearing until February, 1937. This knowledge includes fully documented and reliably verified data concerning vocational history, residences, health, social and sexual behavior, marriages, and the number and developmental histories of the children, both legitimate and illegitimate. The following paragraphs give an analysis of the data gathered about these 102 patients.

Only 13 of this group may be said to have *adjusted* outside the Rosewood School in a manner which has brought no serious damage to the patients themselves and to the community. Four were fortunate in finding jobs as housemaids in homes where they are well treated and their limitations are understood and considered. Two are successful practical nurses. One boy is running an elevator in Washington, D. C. Five girls, though living in poverty and at times depending on support from relief agencies, are happily married and have children who, though moderately retarded, have caused no major difficulties. One imbecile woman lives with her old parents who, though poverty-stricken and dependent on relief, have always given her adequate care and supervision.

All the other 89 persons removed from Rosewood by courts of justice have failed miserably and inflicted grave harm and perils on themselves and the communities in which they live or lived.

Eleven are no longer living. The age at the time of *death* ranged between 19 and 32 years. Eight died within five years following the habeas corpus release. Every one of the 11 patients was in good physical health when removed from the Rosewood School. Seven deaths were due to tuberculosis. One girl died of syphilis of the central nervous system. One died of acute nephritis; she had been released to an irresponsible brother who beat her mercilessly and had her remanded to Rosewood in a moribund condition. One woman, brutally mistreated by her alcoholic husband, to whom she had given six children, died of pneumonia. John H., released together with his two sisters to his psychotic mother, could not adjust at all and was placed in a rural home by the Children's Aid Society. When he reached the age of 25 years, this imbecile person was given a scholarship in a Seventh Day Adventist Academy "to prepare for missionary work." Shortly after entering

that school, the budding theologian slipped while trying to jump on a moving truck and was instantly killed.

Seventeen of the 102 patients were *remanded* to Rosewood after the release. During the interval of freedom given to them in the name of the law, six girls indulged in open prostitution, one boy repeatedly committed arson, two girls deposited illegitimate children of whom one is now at Rosewood after having been raped by her own grandfather, and the other in a boarding home of the Children's Aid Society. Two were brutally mistreated by their legally appointed "custodians." Two brought back to Rosewood advanced tuberculosis and one a gonorrheal infection. Four more were returned on the petition of the maid-seeking women who were dissatisfied with the quality of the girls' service; one of these was later paroled by the Rosewood authorities without a writ, was given a job with really responsible people and is one of the few girls who have adjusted well. One girl was released by Judge X in 1918 on the petition of her schizophrenic brother who had just been paroled from a mental hospital to which he has since returned. Dr. Keating strongly advised against her removal from Rosewood but Judge X wished "to give her a chance to make good." During the following four years the girl was a prostitute who specialized in picking up men near Union Station. She was remanded in 1922 on the intervention of the Travelers' Aid Society and the Henry Phipps Psychiatric Clinic. Five girls, having been remanded after dismal failure, were later again released on writs by courts of justice, whose decisions resulted in prostitution, syphilis, death from tuberculosis, and the birth of illegitimate, feebleminded children.

As far as could be ascertained, 17 patients acquired and transmitted serious *communicable diseases* after their release from Rosewood. Eight contracted tuberculosis, four acquired syphilis, and five were treated for gonorrhea. None cooperated sufficiently with the treating physicians and hospitals. One boy continued cohabitating promiscuously even during his repeated acute gonorrheal conditions.

Eight of the 102 patients, and 11 of the total group of 166 eventually landed in the Springfield or Spring Grove *State Hospital* or in the psychopathic ward of the Baltimore City Hospital. Two were committed after suicidal attempts, one to prevent her from

killing a neighbor about whom she entertained paranoid delusions of prosecution, one after she had tried to kill her own child who now is a patient at Rosewood, one several times in states of alcoholic delirium. Ada S., an epileptic imbecile, was released in 1920 to her father, who refused to keep her and had the judge remand her in 1921, after she had indulged in sexual promiscuity. In 1932, the same judge again released her to her father. A lawyer had assured the judge that the father had an " excellent home " which in reality was a dilapidated, dirty hovel. A few months later, Governor Ritchie of Maryland asked " on behalf of a friend who was interested in the S. family " that Dr. Keating take her back. Dr. Keating explained that she had been twice released on writs of habeas corpus and that he therefore could not take her back. She was committed to the Springfield State Hospital, where she still resides, a demented epileptic woman. Ida S. was committed to Rosewood in 1923 from a reformatory to which she had been sent in 1920 at the age of eight years because of the impossible home situation and her own sex delinquency. She was released on a writ in March 1930 to the custody of her father, a feebleminded drunkard who had been in jail many times for non-support of his family. Ida became a prostitute and a cocaine addict, acquired gonorrhea, married a bootlegger, and was admitted twice to the psychopathic ward of the City Hospital, three times to the Johns Hopkins Hospital and twice to the Spring Grove State Hospital in psychotic states attributable to alcohol, cocaine, barbiturate poisoning and, of course, her feeblemindedness.

Twenty-nine of the 94 girls whose follow-up has been completed turned after their release to *prostitution,* that is, sexual promiscuity for gain. Their " bodies were had " for the pleasure of anyone who wanted them. One girl was arrested for keeping a disorderly house at Fort Howard, Md. Evelyn P. went to live with a man who had deserted his wife and made Evelyn cohabitate with men, living on her income thus earned. Catherine M. was released in 1927 to the custody of her feebleminded, illiterate, immoral mother; on February 3, 1933, Catherine and her mother were both arrested in Boston, Mass., for " lewd and lascivious cohabitation." Edna May H. had sexual relations with her own brother. Catherine H. had after her release incestuous relations with her father who had raped her and given her a gonorrheal infection when she

was seven years old shortly before her commitment to Rosewood and 12 years before a wise judge released her to her family on the petition of her psychotic mother.

Six of the 94 girls served *prison terms* of more than three months' duration. Three are at this moment at the Maryland House of Correction, Katherine A. and Bessie B. for 6 months because of vagrancy and stealing and Anna R. and her latest paramour for one year because of repeated larceny. Agnes, Grace and Ethel D. were released in 1918 to their parents about whom their lawyer said that they were "making some real efforts now to provide a proper home for the children." The parents, just then as ever, were living in material and moral filth, the father had alcoholic tantrums in which he threw everybody out of the house, and the other children had been taken out by him from their boarding homes and sent to beg in the streets. Soon after the release, Agnes, Grace and Ethel also went out begging and were sent to jail. Agnes later became a prostitute and had two illegitimate children; Grace had one illegitimate child from a negro and abandoned it in an alley in Ellicott City; Ethel married and lives with her husband and eight feebleminded, malnourished children in a crowded, filthy, foul-smelling home.

Only one of the eight boys under consideration is making a living. One is dead, and one was remanded to Rosewood after repeated arson. The other five are unemployable because of their low grade feeblemindedness.

There is verified information about *marriages* entered upon by 48 of the 94 girls whose follow-up has been completed. A study of the husbands' backgrounds, personalities and behavior shows that not one of them can be considered as endowed with normal or near-normal intelligence. Making every permissible allowance, we are ready to speak of 10 of the men as relatively stable and responsible individuals. All others were shiftless unemployables. One husband was a post-encephalitic Parkinsonian. Three were epileptics. One was severely incapacitated by advanced multiple sclerosis. Two suffered from syphilis of the central nervous system, two others also had positive Wassermann reactions. One was a birth-injured athetoid cripple. Three were former Rosewood inmates. Fourteen were habitual drunkards. One was a cocaine addict. One was blind and two were deaf. Seven served

jail sentences of more than one year. Three were bootleggers. Two had been dishonorably discharged from the U. S. Service. Seventeen deserted their wives and children. Many were arrested for wife-beating and non-support. None of them, with the exception of the 10 designated as responsible men, ever so much as attempted to provide for his family. One was so lazy that he once burned several pairs of shoes given to his family rather than bring in firewood and dragged his wife and children from one place to another to find out where more relief money could be obtained. One told his wife soon after marriage that he did not like to be tied to one woman and forced her to share their miserable and dirty home with any female he chose to bring with him at night. One met a Rosewood girl at his wife's funeral, introduced himself to her as a weathly hotel owner from Montana, married her, and then turned out to be a brutal, worthless, alcoholic cook who did no cooking, wandered about the country, lived from begging and his wife's occasional earnings as scrubwoman, gave her six children, beat them mercilessly, saw one of them die from starvation and the others placed in an orphanage, and looked on in a drunken stupor when his wife died of pneumonia in an unfurnished room in Minneapolis. One girl, released by a court of justice to Lawyer I's sister, soon ran away and within less than three months married three different men without bothering about the formality of a divorce. Her first husband had her for 10 days and gave her a gonorrheal infection which she promptly transmitted to her second and third husbands. She was arrested for bigamy but her marriages were annulled because all three men had wives from whom they had not been divorced.

Of the eight males whose follow-up has been completed, three took wives unto themselves. Solomon B.'s wife soon tired of him and divorced him. James D. married an imbecile woman born without joints in her knees and right elbow and unable to bend over, wash her face, comb her hair, dress herself and do any kind of work. George M.'s wife was a former inmate of the Rosewood School.

Fifty-one of the 102 patients whose destinies could be followed to the present day have remained childless. The remaining 51 produced not less than 165 *children*, of whom 33 were born out of wedlock. Eighteen of the children died, mostly as a result of utter

neglect. Not less than 108 are obviously and incontestibly feebleminded, that is, have a level of intellectual endowment below that of borderline intelligence. Four have already landed in training schools for the feebleminded and four more are on the waiting list for admission to such schools. Thirty children had to be removed by social agencies from their parents because of desertion or neglect and placed in orphanages or foster homes. Eight of the boys have juvenile court records of larceny, vagrancy, begging in the streets, or burglary, and two of them are now in correctional institutions. One has congenital syphilis. Only 11 of all the children are less than one year retarded in their progress at school. One mother tried to kill her baby soon after birth while still at the hospital. Another mother gave her child away to an unknown 14-year-old girl. Rickets, scabies, impetigo, malnutrition, and pediculosis are rife among most of the children who have remained with their parents. Time alone will tell how many more feebleminded, illegitimate, neglected children this group of released Rosewood patients will in the future bestow on a commonwealth that can do nothing but look on and pay the penalty for indiscriminate habeas corpus releases by its courts of justice.

Summary and Conclusion.

The circumstances were studied under which 166 patients were released on writs of habeas corpus from the Maryland State Training School for the Feebleminded. The destinies of 102 of these patients were followed from the date of their release to the present. Thirteen made a satisfactory adjustment; 11 died; 17 were remanded, and 5 released again after being returned to the school; 17 acquired tuberculosis, syphilis or gonorrhea; 8 were committed to mental hospitals; 29 became prostitutes; 6 served prison terms of more than 3 months' duration; 51 married; 165 children were produced, of whom: 33 were illegitimate, 18 died, 30 were placed in orphanages and foster homes and 108 are incontestibly feebleminded.

The facts speak for themselves and hardly need a commentary. Well sheltered and protected feebleminded persons were dislodged from their logical residence and in the name of justice turned over to maid-seeking women or irresponsible relatives. This was

done against the advice of the psychiatrist who was superintendent of the school and the members of the school board. There is nothing to indicate the judges' criteria governing their decisions about the lawfulness or unlawfulness of the patients' detention.

It must be said in all fairness that there were attorneys and judges who did not, and in some cases refused to, participate in the practice of removing feebleminded persons on writs when they learned that the removal would be injurious to the patients or the community. The writ of habeas corpus, a most valuable safeguard of democracy and personal liberty, cannot be blamed for its unwise application by individual lawyers and judges, who need enlightenment in matters of psychiatric and communal importance. In the State of Maryland, Dr. Keating's was a lone voice in the wilderness. Having no support from the community, he was forced to capitulate. It is up to the psychiatrists and social workers the country over to carry on this education of the jurists. They will find enough modern and civic-spirited members of the bar who will wish them well and help them in their undertaking.

DISCUSSION.

DR. KENNETH B. JONES (Cambridge, Md.).—If Dr. Kanner's study has done nothing else, it has forced the attention of the City of Baltimore to the fact that there is a feebleminded problem in Maryland and that its one institution for the care, custody and training of the feebleminded is a considerable part of its institutional set-up.

I mention this because as a result of a discussion before the Bar Association of Baltimore City of the facts Dr. Kanner has just read, the Baltimore Evening Sun gave it publicity by a double row of inch high headlines clear across the front page of its April 8th edition. That was more space than the feebleminded problem has had in the newspapers in Baltimore City in the whole history of that city's existence.

In fact, neither the feebleminded nor those interested in their welfare have ever before been able to effectively present the problem in such a way as to elicit newspaper interest to any such extent. Dr. Kanner must be a good publicist as well as a good psychiatrist. But, on second thought, there may be another reason that accounts for those one inch high headlines.

I do recall that just recently there has been some newspaper talk about a certain distinguished and revered group of gentlemen of the legal profession whose majority judgments on certain matters have not suited the fancy of certain other distinguished men. So now any suggestion from a member of another profession that might reflect on legal procedure as has been practiced, probably rubs edges that are already raw.

But Baltimore, I am glad to say, has apparently corrected such conditions to a great extent and that even without packing the courts. Time, even though it moves in Baltimore at the tempo of the horse and buggy, cureth—I mean apparently is beginning to cure this particular thing.

Thus, in the last three years only three habeas corpus writs were issued for the removal of children from Rosewood, and in every case the child was remanded to the institution. Further, the courts of Baltimore have an official psychiatrist, one of learning and distinction, and the judges have learned to defer to his judgment in such matters.

But the lack of insight into the magnitude of the problem of mental deficiency and its ever-spreading ramifications in psychiatry, sociology, dependency and education is not confined to those that wear judicial authority; many physicians and even many psychiatrists give it little concern.

Because a feebleminded person has not had complicated life experience, and couldn't tell about them if he had, is probably sufficient reason for being an unfavorable subject for a psychoanalyst. But among this benighted group of children that never grow up, there is a wealth of fields for investigation.

After all, the study of feeblemindedness, like psychiatry, is a study of human adaptibility and is the province of psychiatric medicine. That this section has been established and is now in its second year, I think has proved that the psychiatrists in general are taking an increased interest in the things that we are talking about.

As to Dr. Kanner's paper generally, I think it needs no comment. It is a statement of incontrovertible facts. It not only shows the lack of vision of certain judicial minds and the unscrupulousness of a certain type of lawyer, but more important to me, it seems to prove, or at least adds weight to facts and things that are already known, for example, transmissibility of certain inheritance rudiments that tend to human inefficiency.

As to the trustworthiness of this study, I can vouch to some extent. I was permitted to be the superintendent of Rosewood for a few years and know some of the facts contained in this report Dr. Kanner has given. Dr. Kanner's capacity for painstaking effort and conservatism is well known. I happen to know the psychiatric social worker who worked under Dr. Kanner's direction in compiling this data, and I can assure you she is of the highest type and is again known for her competence and conservatism. Again, the study covers the lives of these individuals over a long enough period and contains the histories of enough people to make it comprehensive and convincing.

I trust that this study may lead to further and similar studies, of which many, of course, already have been made. Apparently, they at least seem to be more practically convincing than some of the long drawn out studies about the Jukes and the Kallikaks, which are more novel-like in form and probably make less appeal to community effort.

In such a study the facts are before you again, that is, they are living facts, if you will, facts that move and do procreate, sometimes frequently and generally in infection.

There is only one other thing I can add. The courts in Baltimore have advanced, they have gone ahead to an appreciable extent and I don't think such a situation could ever occur in Maryland under conditions that now exist.

I think all of us would agree, particularly after hearing this report, that the staff of any institution for mental defectives, of whatever type, is probably much more competent to determine who should or should not be in an institution for mental defectives than the courts could ever possibly be.

DR. LEO KANNER (Baltimore, Md.).—Undoubtedly due to the wisdom of the Program Committee, my somewhat gloomy presentation will be followed by Dr. Hubbell's paper with the constructive possibilities he offers, and I am also glad Dr. Jones has brought the material which I presented as a historical study up to date, showing that conditions have changed in the State of Maryland and that such occurrences as I presented no longer prevail.

THE EXPERIMENTAL NEUROSIS AND THE PROBLEM OF MENTAL DISORDER.*

By H. S. LIDDELL, Ph. D.,
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If we were to visit our Physiological Field Station as strangers for the purpose of studying the behavior of the sheep to be found there we should soon discover that three of those sheep were alike in their differences from all of the others. When we had demonstrated the differences between these peculiar sheep and the other individuals of the flock we should be unable to give any convincing explanation of their peculiarities without reference to their case histories.[1] In each of the three histories we should find a period of months or years of well balanced, predictable behavior followed by the sudden appearance of the abnormalities about to be detailed. These sheep have developed the experimental neurosis first observed by Pavlov in dogs.[2]

The "neurotic" sheep may be identified by the following tests. Unlike the normal trained animal it strenuously resists being led on leash from the barn to the laboratory. When it is placed in the Pavlov frame with loops under its limbs and with electrodes fastened to the left foreleg for the delivery of the mild electric shock which we employ to evoke a defensive reaction in our conditioning experiments, it differs from the normal sheep in being unable to stand quietly awaiting the signal for the coming electric shock. Instead, it exhibits a stereotyped form of hyperirritability in which persistent tic like movements and sometimes tremor of the left forelimb are accompanied by sudden starts and irregular respiration. Signals which indicate no shock now evoke vigorous flexion of the reaction limb and the capacity to give delayed reactions has vanished.

A dissociation of the normal behavior pattern is to be inferred from the effect of drugs. Subcutaneous injections of adrenalin

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in the neurotic sheep decrease the vigor and number of the leg movements which occur at the signal in anticipation of the shock, while at the same time the movements of the reaction limb during the rest intervals are increased. Cortin has the reverse effect.[3]

Records of the pulse rate clearly distinguish between the normal and the neurotic sheep. At the conditioned signal which intimates the approach of the electric shock the pulse rate of the normal animal is little increased, and after the shock soon returns to its initial value; whereas in the disturbed sheep the acceleration of the pulse at the signal for the coming shock is prompt and striking and persists for many minutes after the shock. The increase is often associated with irregularity. Respiration during the course of the tests likewise differs in the two animals. The neurotic sheep exhibits pronounced irregularity in respiration and the breathing remains labored for some time after the shock has been applied.

Outside of the laboratory the neurotic sheep differs in demonstrable ways from its normal fellows. Its general restlessness is shown not only by increase in its daily neuromuscular activity as determined by the pedometer watch, but also by the disturbance in the diurnal variation of its activity as graphically recorded when it is confined to a 24 ft. by 6 ft. scale platform. As contrasted with the normal sheep which remains quiet at night, the neurotic animal is almost equally active during day and night. When the disturbed sheep has been given a long vacation it is as quiet during the hours of darkness as its normal companions but after it has resumed work in the laboratory its nightly activity is greatly increased. When the pulse rate is determined in the barn without the neurotic sheep's knowledge, by means of a long distance stethoscope, it exhibits far greater variability both day and night than in the normal sheep.

Absence from the laboratory for three years was without substantial effect in these sheep. The disorder seems to be permanent in the five cases thus far observed.[4] One sheep exhibited the signs of experimental neurosis for nine years until its death at $13\frac{1}{2}$ years, and two have remained in the disturbed state for six years. Although they might appear to be normal in every respect after a long rest, resumption of the conditioning tests always precipitated the characteristic abnormalities of over-reaction within a few days.

Our sheep, regardless of the diversity of circumstances responsible for the development of the experimental neurosis, show a remarkable uniformity in their disturbed behavior. A careful review of their histories shows in every case a premonitory nonreactive or inhibitory phase of several days or weeks duration followed by the abnormalities of activity, respiration and pulse just described. The neurotic sheep, therefore, may serve as a standard animal preparation with which to explore therapeutic measures of value in restoring the poise or balance of the functionally disordered nervous system. Moreover, the onset of the experimental neurosis marks an end point beyond which the nervous system as a whole no longer effectively integrates exterofective and interofective behavior. It is possible, then, to analyse the conditions of living and regimens of training responsible for the experimental neurosis in order to discover the fundamental factors in the life situation of the sheep which cause its nervous system to work at a disadvantage; *i. e.,* under strain.

Pavlov believed that the fundamental cause of the experimental neurosis in the dog was to be found in the character and temporal relations of the signals indicating food and no food. He thought that when the dog was too perplexed by the similarity or arrangement in time of the positive and negative signals the cerebral cortex was somehow damaged as a consequence of the clashing of intense cortical excitations and inhibitions. We have doubted this explanation from the first because after years of experiments with sheep allowed to run at liberty in a labyrinth from which they never learned to escape except by chance, no manifestations of disorder were ever observed, while some of the same sheep soon developed experimental neurosis as a result of special predicaments in the conditioned reflex laboratory. The relation between signals for shock and for no shock which were found to precipitate the abnormal behavior were various; namely, closely similar rates of the beating metronome, increase in the number of short delayed reactions with brief rest intervals, reactions too long delayed, and regular alternations of signals for shock or no shock when separated by equal rest periods.

We believe that the experimental neurosis is caused by the equivalent of a human conflict situation. The dog or sheep standing

quietly in the harness has through habit relinquished its neuromuscular freedom. When such an animal is called upon to anticipate food or shock at certain signals but not at others it cannot escape the issue. Its reaction, whether motor or secretory, represents a decision arrived at. When the task of making the necessary decision is beyond the individual's capacity, its nervous system undergoes a drastic change in its mode of functioning and the signs of experimental neurosis appear.[5]

We have recently tested our hypothesis in experiments upon the pig. This animal probably ranks with the chimpanzee in the ease with which violent emotional outbursts may be elicited and its varied and vigorous resistance to restraint is notorious.

It seemed reasonable to suppose that if the pig could be led, through careful training, to repress its emotional seizures when placed in the harness during the conditioning experiments, it might be possible to arrange predicaments beyond its capacity to resolve. By such a procedure G. F. Sutherland has lately succeeded in inducing the experimental neurosis in one of five pigs under observation.

Just after weaning, the young pig was taught to run on leash. For a number of days it exhibited determined resistance by crouching with eyes closed and then by struggling and squealing, but it finally consented to be led about the pasture. It was then taught to open the lid of a box to obtain pieces of apple when the apple was delivered at certain signals but not at others. At first it had the freedom of a small room but was subsequently confined to a progressively smaller enclosure in the vicinity of the food box and was finally tethered there. This increased curtailment of freedom induced a brief recurrence of the previous tantrum behavior. Then it was harnessed in front of the food box, where it consented to stand quietly, and a spring electrode was attached to the foreleg.

Now when he attempted to associate an auditory signal with an electric shock to the forelimb the pig continued to ignore the signal after more than 200 tests and although it flexed the foreleg at the shock it immediately opened the food box and even strong shocks failed to elicit either struggling or squealing. The pig had been trained to regard the laboratory as a place in which to be fed.

Sutherland decided to modify its interpretation of the laboratory environment by shocking and feeding it on alternate days. A con-

tinuous tone of 600 cycles in the experimental room indicated feeding day and its cessation for 10 seconds was the signal for apple, while a tone of 750 cycles indicated shocking day and its cessation was the special signal for shock. Ten signals were given each day according to an invariable schedule. Soon the pig resisted the experimenter's attempts to fasten the electrode to its leg and squealed at the application of the shock. But on feeding day its deportment was quiet and its reaction to the signal for food was a prompt opening of the box.

At the signal for the approaching shock the animal became noticeably tense, growling and flexing the leg. Marked tension could also be aroused by a change of tone in the middle of the day's experiment, necessitating an altered interpretation of the environment, and agitation was observed whether the change was from feeding to shocking day or the reverse. With progress of the tests signs of tension subsided but it was noticed that the pig spent much of the time between signals in lifting the cover of the food box. This activity, we suspected, was a means of lowering nervous tension. In order to block this motor outlet the pig received a shock on the foreleg whenever it lifted the lid of the box during the interval between tests on feeding day or at any time on shocking day. It now refused to lift the lid until it heard the apple drop into the box.

The experimenter then postponed the delivery of the apple until the pig opened the cover. In other words, the animal was forced to come to a decision and to act upon it. The consequence of this last procedure was that the pig developed, within a few days, a condition which we believe to be the inhibitory type of experimental neurosis observed by Pavlov in the dog. The animal now delayed its response to the signal sometimes for an hour. With eyes closed and snout resting upon the screen fence of the enclosure, it maintained for many minutes at a time a rigid posture associated with occasional trembling and growling. During this period of immobility a piece of apple could be balanced upon the pig's snout but it would make no attempt to remove it. The opening of the food box, when it occurred, was impulsive. The pig growled, thrust its head suddenly into the box, moving the snout rapidly to and fro, then as rapidly withdrew it, sometimes leaving the apple

behind. At present it refuses on food day to open the box at all or to eat the pieces of apple as they fall even when the lid of the box is propped open.

The behavior of this neurotic pig outside of the laboratory has definitely changed with the onset of its disorder. Formerly it was friendly and docile at all times. Now it keeps away from the other pigs but frequently fights with them and occasionally attacks the attendant when he enters the pig pen.

How shall we characterize this new field of experimental medicine? Its methods are physiological but the relation which it bears to psychiatry seems to us precisely that which the physiology of animal posture bears to clinical neurology. Magnus writes that during ordinary life in monkey and man the attitudinal reflexes "cannot easily be detected because with the higher development of the forebrain and the greater complication of movements these lower postural reflexes are partly suppressed." [6]

In mental disorder the background of ethical standards, social tradition, personal obligation and the like is too intricate for us to perceive clearly the essential biological features of the pattern of action which has been disrupted or to analyse quantitatively the conditions responsible for the damage. The animal subject, particularly the sheep because of its simple way of life, provides an unique test object for analysing the essential conditions productive of nervous strain and derangement. And following the lead of Pavlov's work we recognize the importance of examining mechanically, electrically, and chemically every possible physiological function as it is modified by the nervous disorder which Pavlov chose to call experimental neurosis. Much remains to be done. The conditioned reflex method must be analysed in detail in order to discover its essential strain producing features. Stockard [7] and Yerkes [8] have stressed the importance of genetic control of experimental material. Pedigreed sheep, dogs, pigs and chimpanzees must furnish the materials for our future study. In the pig and the dog, but more simply in the sheep, surrogates for imponderable social influences can be provided by the laboratory worker. He can arrange easily reproducible conditions with which to disturb, sometimes permanently, the balance of the animal's nervous system.

He must investigate its behavior not only during the brief periods of the daily test but during the whole diurnal cycle and further

throughout the animal's experimentally controlled life history from birth to death. From such studies fundamental knowledge relating to mental illness may be anticipated rather than easily controverted similarities between the mentally disordered patient and the experimentally neurotic animal.

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DISCUSSION.

Dr. Thomas M. French (Chicago, Ill.).—I think that psychiatrists will welcome this paper of Dr. Liddell's for a number of reasons. In 1927, when the English translation of Pavlov's systematic presentation of his conditioned reflex work first became available to us, most of us were stimulated by the possibilities that this conditioned reflex work might make our knowledge of our clinically observed behavior more fundamental and precise. But then when we began to study the details of Pavlov's work, our first impression was a bit confusing. The experimental reactions of Pavlov's dogs seemed in many respects quite unrecognizable to us as compared with the behavior of patients. The animals seemed to react in ways for which we couldn't immediately find an analogy in human behavior. Of course, there were exceptions.

The conditioned reflex itself had a recognized analogy to the law of association by continuity and the differentiation process that Pavlov described in the refinement of the reactions of his dogs to more and more complex stimuli.

These had an easily recognizable similarity to learning by discrimination, and besides there was a less precise but quite definite relation that we assumed must exist between the inhibitory phenomena in Pavlov's experiments and the external and internal inhibition that Pavlov demonstrated, but beyond that we seemed to be led into a realm of behavior reactions which seemed totally unfamiliar to us and hard to understand in terms of the common sense psychological knowledge which all of us possess and which, if found, forms the foundation of most of our clinical thinking about behavior.

The reasons for this were in considerable part due to Pavlov himself who early in his investigations definitely resolved to ignore entirely the fact that the animal probably had a consciousness, had subjective experience, such as we have, and divested himself entirely of the guide that our intuitive understanding of other human beings and of animals, based on our own subjective experience, gives us in understanding what the animals do. The reasons for this decision of Pavlov's are easily understandable. His reason was that our subjective intuition is, one might say, a two-edged sword. It increases our capacity for getting a momentary understanding of what another person is doing or what an animal is doing; but, on the other hand, it is too hard to control. One is not sure that one's subjective interpretation, subjective intuitive interpretation of what an animal is doing is really a correct interpretation. Two observers might come to different conclusions and how is one to decide between them? So Pavlov's reaction was to completely disregard consciousness altogether and proceed to study only reactions of the animals that could be directly measured and externally observed and measured.

However, with the advantages that the procedure had, it also had a serious disadvantage. By so doing, Pavlov cut himself off from a great fund of common sense knowledge that all of us possess about psychology, common sense, unformulated knowledge, one might say, that we all use every day. His experiments became experiments that seemed to be more or less isolated from the knowledge that we already have. Of course, in our clinical work, where we have to deal practically with patients, we had to follow exactly the opposite course. We had to start with whatever knowledge we had, and even though it were unformulated, unprecise, attempt to refine it by what procedures we could find.

I think we might all agree with Pavlov's general feeling that methodlogically it had certain advantages to devise a method which made him independent of the subjective impressions; but that didn't necessarily mean he had to entirely isolate himself from the intuition that everyone of us has. We could use it as a general guide without necessarily making the intuitive identification of the animal the basis of our experimentation. His failure to do this isolated him, and this isolation was increased by another feature of his experimentation, that he took one single reflex, one single bit of the animal's behavior, the salivary reflex, as the basis of his experimentation. Although he noted what the animal was doing in general, for the most part that is not recorded in his systematic presentation. So that the isolation from the general clinical observation was increased by the fact that he was only reporting a very small part of the animal's behavior.

One of the things that most impresses me with Dr. Liddell's work is the fact that he is correcting this tendency, that is, in his following of Pavlov's method, he is correcting this tendency to observe only one single, slight response that is characteristic of Pavlov's reported work and he is observing the behavior of the animal as a whole. The result is that the behavior of the experimental animal again becomes humanly intelligible to us instead of leading us into a realm of reactions that takes careful and detailed analysis to bring back into the relationship with clinical observation.

One of the most important findings of Liddell is an attempt to understand the total experimental condition of his animals. One of the most valuable contributions in this paper is Liddell's analysis of the training situation, his pointing out that these reactions of the animal are not spontaneous reactions of the animal such as would occur in an untrained animal, but that the mere fact that the animal will stand in a harness, will submit to the experimental situation is the product of a training, perhaps prolonged in many cases.

Pavlov treated the conditioned reflex as a simple, presumably elementary reaction of the animal. From Liddell's work we begin to see that this reaction is anything but a simple, already present, automatic reaction of the animal. The twitch that the animal gives or the secretion of saliva is already a reaction which has become more concentrated due to the suppression in the experimental situation by this preliminary training in the harness of the total reaction that the animal would otherwise present if it were not in the experimental situation.

I would like to make two short points which I intend to develop at a little more length. In particular we are struck by something that many of us already suspected, that these experimental neuroses, the point Liddell makes, are really comparable to the conflict situation in our neuroses and the demonstration of that is very pretty. We don't need to theorize about it—this experiment with the pig, where it took such a tremendous amount of frustration, one might say, in order to finally compel this pig to become neurotic. We now see a beautiful proof of what we already suspected, that these experimental neuroses were the result of conflict, just as our clinical neuroses are.

I would like also to express my appreciation of Liddell's other hypothesis, or thesis, that this other training to which we subject the experimental animal in order finally to compel him to get a neurosis (whereas in the free state, he wouldn't probably), has very close analogies to the long period of training in childhood in the human which also subjects him or makes him more submissive to restraint than he by inherited nature probably would be, and that this situation of getting an animal to submit to an experimental situation when he stands quietly in a harness is closely comparable to the situation that is produced by education in causing the human being to submit to social restraints. I agree with Liddell that that offers a great many possibilities for the reactions of human beings to social restraint by means of these experimental technics on animals.

INTROVERSION-EXTRAVERSION: THE CONCEPTS AND THEIR CLINICAL USE.[1]

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PART I.

Jung's formulation of the introversion-extraversion [2] principle for psychological types (19) has led to numerous analytical, statistical and discursive studies which variously support, modify or repudiate such a dichotomy.[3] Since Guilford has already compiled extensive reviews of this literature (13, 14), the historical aspects will here be limited to those which are pertinent to the immediate purposes of this study, particularly as regards the clarification of the concepts of introversion and extraversion so variously defined by different authors.

Perhaps the difficulty of analyzing the mass of descriptive material in *Psychological Types* (19) has in itself led to many attempts to re-define the concepts of Jung so that empirical or statistical verity might be claimed for the resulting concepts. Of the many derivatives to which new "type" names have been assigned,[4] it is not our purpose here to treat. Of the redefinitions which still make use of the terms introversion and extraversion, claiming some relationship of origin in or identity of meaning with

[1] From the Department of Nervous and Mental Diseases, Northwestern University Medical School. Presented in abstract (by Dr. Emch) to the Central Neuropsychiatric Association, Oct. 9, 1937.

This study was initiated and carried to completion through the encouragement of Dr. Clarence A. Neymann, Professor of Psychiatry.

[2] The original spelling of Jung will be used here. Exceptions will consist of direct quotations from authors using the spelling "extroversion."

[3] Guilford and Braly (13) feel that "Jung should not be given entire credit for the origin of the E-I dichotomy," adducing thereto various authors who had written of type-divisions of one sort or another prior to Jung. But Jung himself gives a chronological survey of the type-problem antedating his own work, and specifically relates his types to those described by Furneaux Jordan in 1896.

[4] *Cf.* Such terms as, *e. g.*, Rorschach's "introversive-extratensive," Downey's "will-temperament," Allport's "ascendance-submission," etc.

Jung's original usage, there seem to be three chief varieties. First, there is the attempt at simplification; second, the identification of introversion with neurotic tendency—extraversion being given, *per contra*, the connotation of "normality"; and, third, the relating of introversion to the schizophrenic and extraversion to the manic-depressive psychoses.

Typical of the simplified definitions is that of Conklin (4) who related introversion to the subjective conditioning and extraversion to the objective conditioning, of attention.[5] Eleven years later we find Stagner and Pessin (25) using a very similar definition, viz., introversion is "simply a lowered threshold for subjective as opposed to objective experience." These latter authors claim for their definition a correctness based on orthodoxy, with Jung's own phrases as the proof of this orthodoxy. Quite apart from the ambiguity of the phrase "objective experience," however, is the narrowness of the definitive concept here ascribed to Jung, who himself says that the description of the introvert as *inter alia* "subjective" is "misleading."[6] In this connection it is well to indicate Jung's opposition of subject and object, and their traditionally Hegelian synthesis in what is for him "a new psychic fact" or experience which is an "adaptive" function of the individual ("presupposing mutually modifying effects" between subject and object). In this complex "relation of adaptation" arising from mutual modification of subject and object there is little to validate the all-too-easy contrast in "subjective as opposed to objective experience."

Next to the attempt at simplification of the extraversion-introversion concepts, one of the more obscuring factors in the literature pertains to the relation of introversion to neurotic tendencies. It is strange that in so much of the academic psychological literature dealing with this question, we find no mention of Freud, who was the first to introduce that narrower meaning of the term "introversion," which in his system is "one of the invariable and indispensable preliminary considerations in *every* case of psycho-

[5] The later definitions for which Conklin used the names "para-introversion" and "para-extroversion' are not here referred to.

[6] For example, the use of "subjective" in complete contrast to "objective." Thus Jung states further "all perception and cognition is not purely objective: it is also subjectively conditioned." (19; p. 472.)

neurosis" (9). He defined introversion as "a substituting for actual objects phantasies of those objects" (17), explaining that the neurotic "has ceased to direct his motor activities to the attainment of his aims in connection with real objects." Since this is the only application of the term introversion which Freud considers "legitimate," it follows that for him Jung's larger use of the term is "indiscriminate" (9, Vol. IV, p. 31). Freud's definition of introversion has, however, apparently been peculiarly pervasive in the work of psychologists interested in the extraversion-introversion concepts, but, paradoxically enough, they seem to regard this definition as a natural extension of the concept of Jung, rather than as a rigid contraction both in meaning and in use. Thus we have Guilford and Braly (13) paraphrasing White in the following terms: "William A. White accepts Jung's definitions of the types, but he also emphasizes the abnormality, if not the pathology, of introversion," and they conclude from White's presentation "extraversion is allied to the process of individuation, while introversion is allied to the opposite tendency, or regression." White, however, has here presented the narrower Freudian definition and it is by the very use of this Freudian concept of introversion, that he is enabled logically to introduce the concept of regression, since in the Freudian system regression is allied to neurosis and, consequently, to introversion. For Jung, on the other hand, regression is merely another adaptive mode or mechanism in the individual's reaction to life, and takes its place in another Hegelian triad, "progression, regression, altered progression" representing the normal reaction to the presence of obstacles, a sort of *reculer pour mieux sauter* (21). And just as regression for Jung in this way becomes part of the "relation of adaptation" of the individual to life, and is thus divorced from necessary connection with neurosis, so introversion and extraversion are, for him, "regular forms of the transformation of energy" referring to the "dynamic directions" of progression and regression," and have, similarly, no necessary connection with neurosis. It is thus apparent that in the Freudian system introversion, neurosis, and regression are differently defined than are the same terms in the presentation of Jung; so that for Jung "it is a mistake to believe that introversion is more or less the same as neurosis. As concepts, the two have not the slightest connection

with each other" (19; p. 134). That the literature nevertheless contains numerous references to the relation of introversion and neurotic tendencies, suggests that the concept of Freud may have been empirically arrived at by other investigators. Quite apart from the merits of either system in application or use, it is not the purpose of the writers to indicate the validity of one or the other point of view. It is, rather, our purpose to clarify these differing concepts by indicating their origin and thus, if possible, to free each from those confusing elements in the other which it was not meant to imply.

Finally, let us consider the extension of Jung's concepts of introversion and extraversion by means of which has arisen a "traditional association" (13) between introversion and schizophrenia, on the one hand, and extroversion and manic-depressive psychosis, on the other. In support of such an association we have Henderson and Gillespie (18; p. 100) setting forth the relationship as follows: "In schizophrenia it is found that in a strikingly large percentage" the pre-psychotic personality "was of the so-called 'shut-in' type . . . . *This is identical with an extreme degree of* introversion (Jung)."[7] And "the type of personality that is prone to manic-depressive illness is the so-called syntonic (Bleuler) or cycloid (Kretschmer) or cyclothymic personality. *This type represents an extreme degree of extroversion.*" Despite the definiteness of the statement here quoted, and the ascribing of at least the use of one term to Jung, we are unable to find in Jung's exhaustive descriptions of the "types," "attitudes" or "mechanisms" of introversion and extraversion in *Psychological Types* such an association of introversion-extraversion and the psychoses above mentioned. How then does the association arise? Later in the work quoted above we find the following statement: "the development of phantasy and the achievement of phantastic wish fulfillment at the expense of application of energy and activity to reality—at the cost, in other words, of adaptation to reality . . . . is a triumph of the pleasure . . . . over the reality-principle, and the state of conscious preoccupation with phantasy is called *introversion,* to distinguish it from the normal adaptation, which is the direction of the energy or libido outwards to reality (*extroversion*)." (18; p. 108).

[7] Italics ours.

It is clear, therefore, from what has already been said of Jung's concepts of introversion and extraversion that the definition of neither term as here given can be said to coincide with his presentation. Likewise, it is clear that the definition of introversion as "preoccupation with phantasy . . . . at the expense of application of energy . . . . to reality" is exactly the narrower concept of introversion defined by Freud. But is there in the Freudian system basis for the further relating of introversion so-defined with schizophrenia? Actually we find that while Freud makes use of this concept in writing of the neurotic, he states specifically that "it is otherwise with the paraphrenic"[8] who "withdraws . . . . libido . . . . from the objects of the outer world, without replacing them by others in phantasy."[9] Thus, although apparently defined in Freudian terms, we now find the concept of introversion applied otherwise than would be indicated by rigid adherence to his definition. What then of the use of "extroversion" as indicated in the preceding paragraph? It has now become the "normal adaptation," a use which can be ascribed neither to Freud nor to Jung. In fact, Jung expressly indicates that the "progressive movement of life can be extraverted . . . . or introverted," so that the assumption that extraversion alone is the "normal adaptation" may be seen as a clear instance of what he has elsewhere called "the normal bias of the extraverted attitude against the nature of the introvert" (9, Vol. IV, p. 472). Now whether extraversion represents the "normal adaptation" or, as the same authors (Henderson and Gillespie) elsewhere state, describes "the type of personality that is prone to manic-depressive illness," the point here taken is that Jung's categories are thus used to include concepts not included by him, and that certain definitive concepts ascribed to him he, as a matter of fact, expressly repudiates. Further, even though the symptomatology of schizophrenia and manic-depressive psychosis would seem to indicate certain obvious associations with introversion and extraversion, these associations would still require

[8] Paraphrenic, *i. e.*, schizophrenic.

[9] Freud writes later that the libido "liberated by frustration . . . . returns to the ego" (9, Vol. IV, p. 31). For concise explanation of the terms "libido" and "ego" in the Freudian system the reader is referred to extant accepted presentations of the subject, such as the work of Healy, Bronner and Bowers (17).

verification by reference to empirical fact or clinical experimentation. In any case, the definition of introversion and extraversion in terms of their reputed "abnormal" extremes (12) appears to afford doubtful help to investigators who would attempt "validation" of these concepts with a normal rather than with a psychotic population.

It is outside the scope of this study to attempt the correlation of Jung's many-sided and variously described concepts [10] of introversion and extraversion. However, in a recent restatement of Jung's position (21), we find the statement that "the purpose of this distinction" between introversion and extraversion is "not, in the least, to put human beings into one or the other of two pigeon-holes" (21; p. 133), and further that adequate individual adaptation,[11] with its alternation of direction (between introversion and extraversion), is not to be considered a "type" reaction. It is only "one-sided attitudes" which "are not individual but belong to a type" and "the factor of individuality is present only unconsciously and is absent from the conscious psychology"; but it is precisely upon that "conscious psychology" that Jung says we must base any decision as to type, because the individual is "the only competent judge, since he alone knows his motives." [12]

It is probable that one could, from these words, draw a sort of sanction of the questionnaire method. But such a method, to be consistent with Jung's concepts, would have to take into consideration "type-attitudes," which are based on four "root-functions" (thinking, feeling, sensation and intuition), which may and do move forward and backward, "dynamically directed . . . . inwardly or outwardly" and generally alternating between the two. It seems highly improbable that all these factors, if present in individual reactions and elicited by items of a questionnaire, could be reduced to simple mutually exclusive opposites on a linear con-

[10] For one of the best epitomic statements of these concepts as described in *Psychological Types,* the reader is referred to H. Klüver (20).

[11] Adequate individual adaptation (the relation of adaptation being for Jung basic and "biologically" grounded) is to be achieved by a "directed attitude" in which *alternations* of direction (introvertively and extravertively) appear as required by changing "external" and "internal" circumstances.

[12] Insofar as the "subjective conscious psychology" could give the clue to "collective reactions" in "collective situations."

tinuum without at the same time violating one or another implication of the assumed type-dichotomy.[13]

Despite the apparent difficulty of such a task, questionnaires have been devised and are in every-day use to determine extremes of reaction variously described by supposedly differentiating items, and grouped broadly into the two categories, introversion and extraversion. These questionnaires, from that of Freyd (10) originally, have used so-called discriminatory items culled from the descriptive literature of introversion and extraversion. In so doing, they have perpetuated much of the confusion which seems to stem from the literary treatment of the subject by Jung. From these questionnaires, based on concepts whose origins and definition had not been clarified, a single numerical score is drawn to do the very thing which Jung said it was never meant to do, viz., to "pigeonhole" an individual in one or the other of the two categories of introversion and extraversion.[14]

The question then arose: even apart from the validity of a numerical score, do test items in introversion-extraversion questionnaires describe anything which is clinically or empirically recognizable as related to some definition of introversion and extraversion? And from this it became a question in the minds of the writers: how do clinicians, using such questionnaires, relate the supposedly descriptive test items to their own concepts of introversion and extraversion; or in other words, what uniformity of clinical opinion exists as to the diagnostic value of test items for the differentiation of extreme groups on the so-called introversion-extraversion scale? It was this question which led to the investigative procedure outlined in Part II of this study. And from this, the question next arose: how does the diagnostic value of items, as determined by clinical opinion, correspond with item diagnostic value as determined by an objective (statistical) method for differentiating extreme groups? The investigative procedure for determining this correspondence of clinical and statistical evaluation is outlined subsequently in Part III.

[13] *Cf.* in this connection, Guilford (14), who refers to the "fictitious continuum" involved in the various tests of introversion and extraversion.

[14] Even though "degrees" of difference between individuals are supposedly indicated by score-values.

PART II.

Statement of the Problem.

The more specific objectives growing out of this purpose are to determine (1) if the concepts of I and E [15] are similarly interpreted by students of personality, (2) if degrees of I and E can be consistently discriminated by competent judges, (3) the extent of agreement or disagreement regarding these concepts, and (4) the factors by which agreement or disagreement are probably determined.

Method.

The consistency of opinion among a group of judges may be studied by the technique used by Thurstone and Chave (26) in building an attitude scale. Similarly, the rating scale used by the same authors to study statistically "discriminable differences" between verbalized attitudes may be used to determine the degrees of such differences when items of introversion and extraversion tests are rated. There are usually 11 points or steps of gradation in the scale ranging from one extreme through a neutral point to an opposite extreme. The very nature of such a scheme implies one dominant factor which runs throughout the traits to be classified, and implies that variations in the degree to which this factor is present may be represented on a linear continuum without seriously distorting the concepts involved. Such assumptions are probably never entirely justifiable, but the technique, nevertheless, offers one way of giving some quantitative expression to the variability of interpretation which a group of judges bring to the same set of items.

One hundred and ninety-five items were selected from a group of representative I-E tests. These tests were:

1. The Neymann-Kohlstedt Test (24).
2. The Bernreuter Personality Inventory (2).
3. The Allport A-S Reaction Study (1).
4. The Colgate Personality Inventory (22).
5. The Northwestern University I-E Tests (11).
6. The Marston Rating Scale (23).
7. The Conklin Test for Interest Differences (5).

[15] The initials I and E will be used in this section to obviate too frequent repetition of the complete terms Introversion and Extraversion.

Special interest dictated the inclusi n of the entire Neymann-Kohlstedt test. Items were selected from the other tests named to the extent that they appeared to the writers to lack ambiguity in form of statement. These items were then restated to read in the third person and mimeographed on a perforated page so that they might be easily separated for classification by the judges.

Instructions to those asked to participate consisted in explaining the nature of the problem and the method by which the items were to be classified. The 11-point scale used in this experiment ranged from a plus five for extreme E through zero as a hypothetical neutral point to minus five for extreme I. Zero category was used only when neither I nor E were supposed to be present. In order to avoid a classification of these items merely on the basis of conventional text-book definitions, the instructions read, in part, as follows:

> Each of the test items is to be classified in one of these categories according to the degree of Introversion or Extraversion which in your opinion it may express.

The extent to which any item or all the items are represented over the scale becomes the measure of ambiguity present in the concepts of I and E as understood by this particular group of judges. The judges were selected from among both psychologists and psychiatrists. The criteria used in the selection of judges from the American Psychological Association were: (1) that records in the year book indicate experience either in research or teaching with personality tests, and (2) that professional and theoretical background be of the level usually indicated by the presence of a Ph. D. degree. The psychiatrists were selected on the basis of membership in the American Medical Association and either The American Psychiatric Association or American Orthopsychiatric Association. Sets of material were sent to 250 individuals.

Results and Interpretation.

One hundred and fifteen responses to the letter of instruction and questionnaire were received. Of this number, 85 judges completed the sorting of I-E items in accordance with the instructions and 25 responded with letters explaining variously that due to theoretical position or clinical experience with the tests, they found

nothing sufficiently definite in the concepts of I and E to permit them to classify the items as requested. Five replies had to be omitted from the tabulations since they were incomplete.

In the expressed opinions received it was obvious that the confusion in definition of the concepts of introversion and extraversion, already remarked, was recognized by clinicians. Thus, 18 judges considered these I-E items, culled from representative tests, "Too ambiguous for classification" unless other explanatory information or clinical description of "cases" was available. Six judges felt that other variables of personality than introversion-extraversion were included in these items, and that "linear" analyses were, therefore, untenable, while six others considered that I-E classification of the items was "possible," but that division into "degrees of I or E would be 'arbitrary' or 'too difficult.'" Fourteen persons questioned the validity of the entire concept in theory or use.

From the items as graded in the 11 categories by the 85 judges or subjects, a table was prepared wherein was indicated the frequency with which each item was classified in the various categories. From this tabulation the data of Fig. 1 and Tables I to III were derived.

There were 16,449 classifications tabulated. Fig. 1 gives a graphic representation of the frequency with which each of the 11 categories was used. Two striking tendencies are indicated by this graph. The one is the clustering of classifications about the hypothetical neutral point, the other is the tendency to classify in terms of conveniently large differences, such as -3, 0, $+3$, rather than in terms of finer gradations. With this group of items supposed to indicate either introversion or extraversion, one might have anticipated a bimodal curve with a relatively low frequency at zero. Ninety-seven per cent of the 195 items were represented with varying frequencies in the neutral category. The tendency to classify in conveniently large differences is, in part, another expression of what Coover (6) has called "mental habit." This tendency was probably reinforced by the nature of the descriptive items themselves whose frequent lack of definiteness prevents finely graded classification. This will be more clearly brought out in the tables to follow.

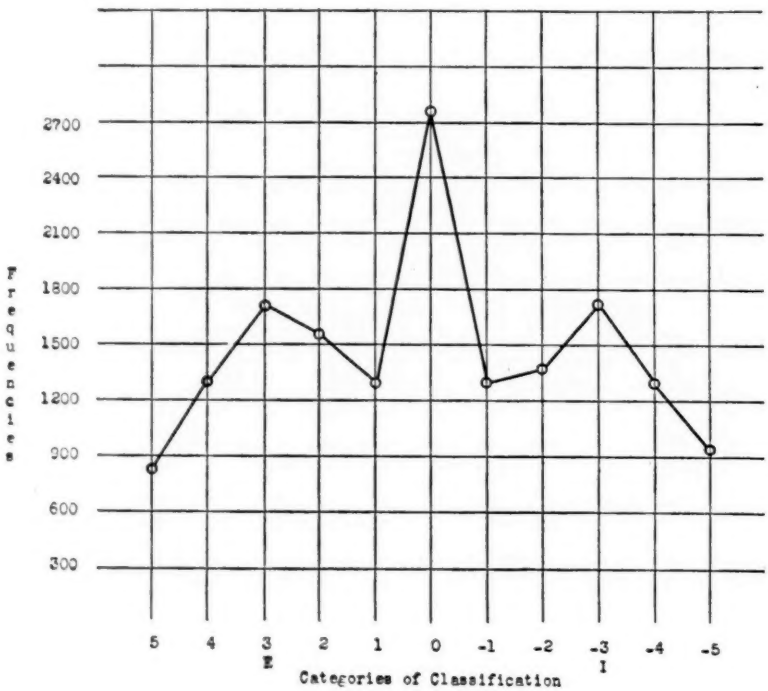


FIG. 1.

TABLE I.

Category frequency per item.	Item frequency so classified.	Percentage of total no. of items.
11	20	10.5
10	22	11.3
9	26	13.3
8	50	25.6
7	59	30.2
6	17	8.7
5	0	0.0
4	1	0.5

Statistical average = 8.17 categories.

Frequencies in this table indicate that 90.2 per cent of the 195 items were classified in seven or more of the categories. This means that almost all the items were so ambiguous in their I-E reference that disagreement arose not only as to the degree of I or E present but actually as to whether it was an I or E trait which was being described by the test item. The statistical average of 8.17 for the items in Table I indicates that the typical or usual item is represented over at least eight points of the scale, which emphasizes the fact that disagreement frequently arises not only as to the degree of I or E supposedly portrayed by an item but also as to the pattern of traits which compose I or E characteristics.

It may be suggested that for measures of variability, percentile or quartile values more accurately represent the results since they

TABLE II.

Q_2 values.	Frequency.	Q_2 values.	Frequency.
4.40	1	2.00	35
4.00	1	1.60	24
3.60	2	1.20	25
3.20	9	0.80	19
2.80	14	0.40	24
2.40	23	0.00	18

Statistical average = 1.74.

are less subject to the influence of extreme cases of low frequency. Q-values have accordingly been computed and their distribution is indicated in Tables II and III.

Table II shows the distribution of medians of each of the 195 test items. Since signs have been disregarded, the values may be taken to represent not only the medians but the extent of Q_2 deviations from zero or the hypothetical neutral point. The statistical average of this distribution is 1.74 steps from the zero point, indicating that there was considerable conservatism on the part of the judges as to the degree of I or E they considered described by the items. But it also means that in many cases the representation of the items over the scale was so wide, that the central tendency of the classifications was necessarily close to zero. Approximately 37 per cent of the I-E test items contained either so much ambiguity or so little clear cut association with the judges' concepts of I or E that their median values were one step or less from the neutral point.

Thurstone and Chave (26) have shown that when statements are rated by a group of judges on the basis of a scale such as is used in this study one criterion of ambiguity of the items may be found in the size of the interquartile ranges. Table III presents the distribution of the item inter-quartile values.

Although no definite limit of tolerance for ambiguity value has been indicated by Thurstone and Chave in their selection of items for the measurement of attitudes, they nevertheless avoid items with Q-values (Q_3-Q_1) above 2.50 or 3.00. The average Q-value of the selected items in their study appears to be about 1.75. Of the 195 items in the present study, about 11 per cent have a Q-value of 1.75 or less, while 31 per cent have Q-values of 2.50 or greater. This leaves 58 per cent of the items as cases of borderline

TABLE III.

Q_3-Q_1.	Frequency.	Q_3-Q_1.	Frequency.
4.00	1	1.60	60
3.60	9	1.20	11
3.20	12	0.80	6
2.80	12	0.40	4
2.40	35	0.00	1
2.00	44		

Statistical average = 2.23.

ambiguity and 89 per cent of the items are either cases of borderline ambiguity or are above an accepted criterion of ambiguity. The Q-value of the average item (2.23) should be considered high in comparison to the results of Thurstone. For while the items of Thurston's scales are derived from common parlance, the I-E test items included in this study have been widely used as elements of purported measuring devices. Theoretically, less ambiguity should attend the second set than the first. It should not be too much to expect that the tried elements of commercialized measuring scales should convey meanings more definite than items concerned with popular opinion.

Again, theoretically, one might expect a negative correspondence between the size of the interquartile range and the deviation of the median from zero. That is to say, those items most often identified by the judges as descriptive of extreme I or E, should have lower ambiguity values. The Pearson correlation coefficient for the pre-

ceding two series of values (Q_2 and Q_3-Q_1) was found to be -0.17; *PE*, $\pm.047$. Since the coefficient is 3.6 times the size of the probable error, extra-chance factors are indicated. For purpose of showing definite relationship between the variables or for inferring the values of one variable from the other this coefficient, however, is little better than chance. There appears, therefore, to be almost no relationship between the median values and the interquartile values, thus controverting theoretical expectations.

A further measure of the consistency of opinions, as indicated by the rating scale, may be found in a correlation of any two sets

TABLE IV.

Pair no.	Coefficient of correlation.	Standard error of estimate.
1	.677	2.04
2	.785	1.54
3	.648	2.42
4	.754	1.75
5	.793	1.94
6	.643	1.69
7	.505	1.30
8	.607	2.20
9	.715	1.64
10	.700	1.95

Average $r = .672$.
Average $\sigma_{est\ y} \pm 1.84$.

of ratings taken at random. The attempts to correlate the ratings of each set with every other set would have required the computation of more than 6000 coefficients. This task, however, is not necessary if a small sample is found to give fairly consistent results. Twenty sets of ratings were, therefore, selected at random and paired. The 10 pairs of ratings were then correlated with results indicated in Table IV.

There is sufficiently low variability in the series of coefficients so that further pairs might be expected to yield similar results. While these coefficients indicate a correspondence between the ratings of one judge and another that is considerably above chance, the fact that the judges had the same concepts in mind in only a very general way is indicated both by the size of these coefficients and by the size of the standard errors of estimate. Thus, in using the

regression equation for predicting the ratings of x from known ratings of y, there appear to be only 68 chances in 100 that the predicted value be within the estimated average range of ± 1.84 steps of the scale. When this value is multiplied by two to include both plus and minus variations, it becomes 3.68. When three times the standard error of estimate is computed for statistical certainty, this value is seen to take in nearly the entire scale of 11 points. Considerable variability or lack of correspondence in the paired ratings is, therefore, definitely indicated.

Further evidence of the limitations of a coefficient of correlation in indicating the correspondence in paired ratings is indicated by the graphic function of the coefficient of alienation from which it is known that coefficients of correlation below .90 have very little value as bases of prediction. According to these statistical relationships, the average coefficient of correlation of .672 indicated in Table IV is only 25 per cent better for predicting x values from y values than if the average value of x were predicted in each case. Here, again, it is apparent that the judges entertain similarity of concepts regarding I and E in only a very general way. While the coefficients of correlation are, on the one hand, high enough to indicate this general degree of correspondence, they are, on the other hand, low enough to show that considerable disagreement will, nevertheless, be found in comparing the item ratings of one judge with those of another.

PART III.

Statement of the Problem.

In Part I, the present status of the concepts of introversion and extraversion as they are found in the literature was described. The results of Part II indicate statistically the confusion contributed by the disagreement regarding these concepts among psychologists and psychiatrists who are familiar with the I-E measuring devices now so widely used. The purpose of this part of the study is (1) to determine critical ratios for individual test items to serve as objective criteria of I-E descriptive values of items, and (2) to compare these critical ratios or "diagnostic values" of the items with the judges' ratings as determined in Part II.

The use of the term "diagnostic value" is not meant here to imply that answers of subjects to I-E test items either singly or collectively, reveal clinical entities. The term arises from the observation that the "yes-no" answer frequencies to some test items are more consistently reversed than are others, when statistical comparisons are made of the groups of subjects at opposite ends of a distribution. It should be expected that, if a given item has been a factor in differentiating between the two groups of subjects who make the extreme I and E scores on the entire test, then that item will tend to have reversed frequencies of "yes-no" answers when the responses of the two extreme groups to that item are compared. The method is applicable principally only where a dichotomy of answers to the items is expected. To the degree that an item differentiates between those subjects who make the extreme scores, it represents an extra-chance factor in determining the form of the distribution and the consistency of positions occupied by the population units of the distribution. The latter factor is the more important since normality of distribution may be approximated by such a method as the tabulation of chance frequencies of head and tails in a penny-tossing experiment. In such a distribution, composed entirely of frequencies dependent upon chance, any given unit of the population might in later experiments be found in any part of the distribution. "Diagnostic" items are supposed, therefore, to represent those extra-chance factors which determine, within limits, the consistency with which particular units of a population will continue to appear in the same part of the distribution on successive occasions. These "diagnostic" items may be identified by a critical ratio method to be described later.

Test validity is not necessarily determined by high critical ratios of the individual items. These ratios indicate the relative effectiveness with which the items of the test distinguish or separate some consistent set of differences among individuals, but that this set of differences corresponds to the factors which the test is purported to measure does not necessarily follow. However, the internal consistency of a test may be built up through a selection of only such items as have high critical ratios. Problems of validity, reliability and dimensionality can more appropriately be considered later. The writers are, therefore, not committed to the proposition that

high " diagnostic values " of descriptive items represent the degree to which those items are associated with the conventionally designated trait patterns of introversion and extraversion.

Methods and Results.[16]

In this section of the study the following tests were used:

1. The Neymann-Kohlstedt Test.
2. The Bernreuter Personality Inventory.
3. A third test made up of 90 items from the remaining tests mentioned in Section I.

The first two tests were used because they are composed of items which appear most frequently in other I-E tests and may for this reason be considered representative of this type of test. The third test was constructed in order to compare more extensively the critical ratios of items with the consistency of opinion as determined by the methods of Part II.

The Neymann-Kohlstedt Test.

This test was given to 622 liberal arts and medical school students.[17] The test was scored in the usual way, $+1$ for the theoretically extraverted responses and -1 for the theoretically introverted responses. A fairly normal distribution was obtained with a mean of 4.1 and $\sigma = 11.1$. The curve was skewed somewhat toward the negative side.

The criterion groups were selected by taking all the cases above $+1\sigma$ and below -1σ. There were 92 cases in the E-group and 60 cases in the I-group. The frequencies of " yes-no " responses by the subjects in both groups were tabulated for each item and the

[16] Interpretations or brief discussions will accompany the statement of the results of each test. A more general discussion is reserved for a special section.

[17] By accident rather than by design there were 311 in each group. Of passing interest was the fact that when separate averages were computed, the difference between them was 4.9 with a standard error of difference equal to 4.7. The liberal arts students appear to make scores somewhat more toward the E side of the scale. Reliability, split-half method, was .45, corrected by the Spearman-Brown formula, was .63.

percentage values calculated. The following formula was then applied to the appropriate data of each item:

$$\sigma_{(p-p')} = \sqrt{\frac{pq}{n} + \frac{p'q'}{n'}}$$

This formula is offered by Dunlap and Kurtz (8) for finding the standard deviation of the differences of two proportions when they are uncorrelated. p is the percentage of "yes" responses and q the percentage of "no" responses; n is the number of cases in the particular group. Following the application of this formula, it is possible to determine the final critical ratio for the difference in the percentage of "yes" answers between the two groups ("no" answers yield the same result). The formula is,

$$\text{C. R.} = \frac{p - p'}{\sigma(p-p')}$$

Ordinarily, a critical ratio of three or more is considered statistically reliable. That is to say, there is high probability that extra chance factors have been operative in the production of the frequency difference in type of answer to the particular item when the criterion groups are compared. However, as will be seen presently, a critical ratio of only three may be considered rather low.

Table V gives the critical ratios for each item of the Neymann-Kohlstedt test.

Nine items are accompanied by a critical ratio of less than three, or the value proposed by other authors (16; p. 433; 25). Eighty-two per cent are, therefore, above the usual standard of requirement. It does not seem to the writers, however, that critical ratios are sufficient by themselves for the selection of items which have true differentiative value. The items in Table VI with their accompanying percentages of "yes" and "no" answers will illustrate the possible objections.

Items numbered 15, 23, and 39 evidently have high differentiating value. The critical ratios are not only high but the "yes-no" percentages are proportionately reversed. It is apparent that for these items a "yes" response in one criterion group is far more likely to mean the opposite of "no" in the other group (or vice versa) than would be the case with items 3, 8, or 49. This is not due

TABLE V.

Test item.	C. R.	Test item.	C. R.	Test item.	C. R.
1	9.8	18	5.0	35	3.5
2	6.8	19	0.5	36	3.0
3	5.3	20	1.0	37	0.4
4	5.8	21	6.3	38	10.5
5	5.8	22	8.0	39	13.0
6	5.4	23	9.5	40	5.1
7	7.1	24	4.9	41	9.5
8	2.6	25	0.9	42	4.6
9	7.4	26	0.1	43	0.2
10	14.7	27	10.0	44	1.0
11	6.1	28	9.8	45	6.6
12	9.8	29	3.0	46	7.5
13	6.6	30	5.0	47	3.6
14	4.6	31	9.2	48	9.8
15	12.6	32	3.5	49	4.2
16	5.9	33	1.4	50	7.1
17	5.2	34	10.7		

Average = 6.00.
Range, 14.7 to 0.1.

TABLE VI.

Item no.	I—group.		E—group.		Critical ratio.
	% yes.	% no.	% yes.	% no.	
3	86	14	50	50	5.3
8	16	84	0	100	2.6
15	85	15	12	88	12.6
23	20	80	83	17	9.5
35	29	71	6	94	3.5
39	11	89	84	16	13.0
42	32	68	69	31	4.6
49	22	78	54	46	4.2

merely to high critical ratios but to the reversed arrangement of the percentages. Item three has a significantly high critical ratio, but the responses of the E-group are of a 50-50 frequency. This means that while the extreme I's are more likely to say "yes" to the question it appears to be a matter of indifference to the E-group. Item 42, which has a lower critical ratio, has nevertheless reversed percentages of "yes-no" frequencies. Were test building the objective of the analyses, item 42 would be preferred to item 3 since the dimensionality of the resulting test would be more effectively reduced. That is, items for which results are obtained similar to those accompanying 42, as well as 15, 23, and 39 are probably more closely associated with a "G-factor" common to the whole test.

The stability of the critical ratios with retests was studied. On the basis of the above criteria, 21 items from the Neymann-Kohlstedt test were selected for the retests. They were

1	10	14	23	28	38	45
4	12	15	24	31	39	46
7	13	22	27	34	41	48

As a separate test this group of items was given to 220 subjects. Critical ratios were computed in the manner already described. The stability of the ratios is indicated, in part, by the degree to which the paired ratios correlate.[18] By the rank order method, (ρ) the stability factor, was found to equal $0.45 \pm .03$. This value is high enough to indicate a reliable positive relationship between the two sets of critical ratios; it is also low enough to indicate some fluctuation between the first test and the retest. The average variability of the critical ratios was 2.0. This value is sufficiently small to show that high ratios tend to remain high, while low ratios tend to remain low. However, 8 of the 21 items showed a change in ratio of from three to seven points. In the light of these results, critical ratios of three or even four might drop below the criteria of reliability on later occasions. Therefore, were one selecting items for a test on the basis of the criterion-group method he would probably be justified in setting four as the lower limit of critical ratio values.

[18] Since these 220 subjects had participated also in the first test, scores on the selected 21 items were computed for the first test. Scores for this short form were correlated. The reliability coefficient was 0.77.

The Bernreuter Test.

This test was given to a group of 450 students. They were instructed to avoid using the doubtful category as far as possible. The tests were scored on the basis of 55 items indicated by the Bernreuter Scoring Key to be the most related to the I-E variable.

TABLE VII.

Original Bernreuter item no.	Critical ratio.	Original B. item no.	Critical ratio.	Original B. item no.	Critical ratio.
1	8.2	56	2.8	93	3.3
5	6.0	57	5.7	96	3.2
10	4.4	60	2.5	98	4.4
12	2.5	62	7.1	99	10.0
14	7.6	66	5.1	100	7.3
18	5.6	68	0.7	104	2.2
19	0.3	69	9.4	106	4.8
24	11.3	71	8.2	109	8.0
26	8.6	72	15.7	113	7.6
39	16.2	73	9.8	114	5.3
43	0.6	75	5.4	115	7.3
44	4.2	77	4.2	116	5.1
45	5.1	80	2.0	118	7.4
46	5.5	81	5.4	119	6.5
47	1.4	82	2.7	121	8.0
48	9.4	83	4.2	123	3.0
49	8.6	86	7.1	125	7.0
51	8.4	88	9.7		
54	7.0	91	8.8		

Average = 6.3.
Range, 16.2 to 0.3.

Separation of criterion groups in the manner previously described yielded 73 cases in the E-group and 67 cases in the I-group. Table VII shows the residual items with their corresponding critical ratios.

According to the criteria previously described by the writers (C. R. = 4 or more; proportionately reversed percentages of "yes-no" answers), the following items may be preferred: 1, 14, 18, 24, 26, 39, 48, 49, 51, 69, 71, 72, 83, 86, 88, 91, 99, 100, 109, 113, 114, 116, 119.

The Third Test.

This test, as previously described, was given to 248 subjects, the criterion groups containing 40 subjects each. The items below are those which satisfied the criteria set up by the writers.

Item no.		Critical ratio.
1.	Are you frequently gloomy or moody?	10.8
2.	Are you one who seldom leads at a social affair?	9.6
3.	Are you self-conscious, easily embarrassed, timid or bashful?	9.2
4.	Can you always produce a good excuse when the situation demands one?	7.5
5.	Do you talk less than others when with others?	7.1
6.	Are you reserved and distant except to intimate friends?	6.6
7.	Do you find it difficult to speak in public?	6.2
8.	Do you enjoy speaking in public or entertaining a group?	6.2
9.	Are you pretty good at bluffing when you find yourself in a hole?	6.2
10.	Do you avoid talking before a group?	6.1
11.	Do you tend to overestimate the abilities of others when you compare them to yourself?	5.9
12.	If given time could you sell anything to anybody?	5.4
13.	Do you frequently get the blues?	5.4
14.	Are you modest and unassuming often representing yourself at a disadvantage?	5.2
15.	Do you feel that your deepest emotions usually go unexpressed?	5.2
16.	Are you often troubled by your conscience even in matters of little consequence?	5.2
17.	Do you prefer a narrow range of intimate friends?	5.0
18.	Are you very sensitive and easily hurt?	4.8
19.	Are you humiliated by jeers even when you know you are right?	4.5
20.	Do you prefer activities demanding pep and energy but not exacting care?	4.4
21.	Do you worry over possible misfortune?	4.4
22.	Do you usually cross your bridges before you come to them?	4.3
23.	Do you frequently experience periods of loneliness?	4.2

In Table VIII the total group of 90 items and the selected group of 23 items are compared on the basis of average and range of critical ratios.

TABLE VIII.

	Total group.	Selected group.
Average	3.5	6.0
Range	10.8 — 0.31	10.8 — 4.2

In the foregoing material of this part an analysis of representative I-E test items has been made on the basis of the effectiveness of these items in consistently differentiating between criterion groups. Through this analysis critical ratios have been obtained which may be taken to represent empirical "diagnostic values." In Part II, methods and results were described whereby the same items were rated by expert judges on the basis of a theoretical capacity of the items to represent the traits of introversion or extraversion. These ratings, statistically analyzed, may be taken as theoretical "diagnostic values." There are two assumptions which may be tested by a comparison of these two sets of results. The first is that the higher the critical ratios of the items the greater should be the deviation of the average theoretical rating (Q_2) from the neutral zero point. The second assumption is that the higher

TABLE IX.

	Total group.	Selected group.
Q_2	.364	.092
$Q_3 - Q_1$	−.015	−.100

critical ratios should correspond to lower ambiguity values ($Q_3 - Q_1$). Both of these assumptions may be tested by a correlation of the paired values indicated.

Table IX shows the coefficients of correlation when critical ratios of both total group (195 items) and selected groups (67 items which satisfy the aforementioned criteria, are correlated with Q_2 and $Q_3 - Q_1$ values.

With one exception the coefficients in Table IX are approximately zero. It is surprising to find the coefficients so low even after a selection of only those items with critical ratios of four and above (selected groups). On the basis of these results, it may be concluded (1) that there is little or no relationship between average position (Q_2) to which professional judges assign an item on an I-E scale and the capacity of that item to elicit opposed answers (critical ratio) from criterion groups who take an I-E test; (2) that there is no relationship between the ambiguity value of an item ($Q_3 - Q_1$) and its critical ratio.

Discussion.

The ambiguity of definition so obvious in the literature of introversion-extraversion is seen, in the foregoing results, to be reflected in the use of these concepts by clinical psychologists and psychiatrists. Lack of consistency in use was first indicated in this study by that group of clinicians who, though obviously familiar with the terms introversion-extraversion and widely used tests from which items were taken, nevertheless did not consider these concepts sufficiently definite to permit even generalized judgments as to whether the traits in question might be descriptive of either introvertive or extravertive tendencies. In this connection, it is of interest to note that ten years ago June Downey (7), who requested 280 members of the American Psychological Association to classify themselves as either extravert or introvert, received from 40 per cent of that number answers in which the subjects, in addition to declining so to classify themselves, criticized the terms introversion-extraversion severely, using among other appellations the adjectives "mythological, unscientific, and without significance."

In our study, those judges who did make the requested classification of items not only showed inconsistencies of judgment in reference to degree of introversion or extraversion described in specific items, but actually as to whether it was introversion or extraversion of which the trait in question might be descriptive. Thus of 195 items, there were only 13 represented on one or the other side of the I-E scale including zero, the hypothetical "neutral" point, and only one item [19] was represented on one side of the scale exclusive of zero—and then in four of five possible "degrees" of the introversion scale. Contrariwise, there were 20 items so ambiguous in their introversion-extraversion reference as to be placed in all 11 categories of the scale. Of these 20 items, one (describing frequent fluctuation of mood) is found in the 36 item "typical" test of introversion-extraversion compiled by Guilford and Guilford (15) from the most frequently used descrip-

[19] "Secretive; seclusive and 'shut-in'; not inclined to talk unless spoken to." This item relates interestingly to the schizoid personality traits described by Henderson and Gillespie (18) and indicates the extent to which categories of psychoses have, without explicit objective investigation, become associated with the introversion-extraversion dichotomy.

tive items in currently used clinical tests. Further, 6 of the 20 items, though somewhat differently phrased, are similar in meaning to six items in the "typical test," and one of the 20 is a reversed statement of an item in the Guilford group. It seems obvious, therefore, that a descriptive item, no matter how frequently found in the literature or clinical tests of introversion-extraversion, can not be said to have constancy of meaning or of I-E reference in clinical use.

Further indication of qualitative ambiguity of I-E reference is seen in the large use by the judges of the zero or hypothetical "neutral" category. Also, although there may be, as Coover (6) points out, rather general tendencies to use certain conveniently large categories of judgment, it nevertheless seems significant that +3 and −3 indicated for most of the judges their limits of description of degrees of introversion or extraversion although the scale permitted finer distinctions. Thus we can not only say with Guilford (14) that "no measurement of I-E . . . . means much unless the name of the test is given," but from our results it can be concluded that no use of these concepts can be considered meaningful unless the structural pattern of attitudes or behavior traits which the writer or clinician has in mind is first made explicit. However, since Jung, very few writers on introversion-extraversion have taken the trouble so to state their concepts, and Jung's literary description is obfuscated by so much verbiage as to be useless for test or measuring purposes.[20]

If the literature of introversion-extraversion and subjective evaluation by qualified clinicians made these concepts appear to have so little validity as determined by consistency of use, the question next arose as to whether a statistical criterion for item "diagnostic value" could be found free of such tremendous variability as was obvious in expressed clinical opinion. The "critical ratio," insofar as it differentiates between extreme groups of reaction or response to the items of a questionnaire, appeared, as we have seen, to be such a measure. But what these extremes of reaction or "criterion groups" constitute is yet another question. For the moment, it may be conceded that they correspond in a

[20] It should not be forgotten, however, that Jung did not, as a matter of fact, intend his concepts for such use.

manner to the concepts of introversion or extraversion described by some or any of the writers on the subject. Assuming this correspondence, we would expect to find high correlation of the critical ratio with judges' ratings as to I-E "value" of a given item. Actually, such correspondence was so insignificant as to indicate only nine items which could be said to show any such relation between statistical "diagnostic value" and judges' "opinion value," if the fairly rigid criteria of ratings on only one side of the scale (including zero) and a critical ratio of 4.00 or greater were applied. The nine items fulfilling these requirements were the following:

1. Wishes to be alone most of the time.
2. Is self-conscious; easily embarrassed; timid or bashful.
3. Reserved and distant except to intimate friends; does not form acquaintanceships readily.
4. Finds it difficult to speak in public.
5. Likes to get things done quickly.
6. Often acts on the spur of the moment.
7. Is more interested in athletics than in intellectual affairs.
8. Prefers to spend his vacations at a lively resort.
9. Is pretty good at bluffing when he finds himself in a hole.

As grouped here, in accordance with judges' ratings, it will be seen that the first four items in their opinion describe introvertive tendencies; the last five, extravertive traits. The relationship between items such as two and four, and the similarity of consequence of traits such as two and three are obvious. Likewise, fairly obvious related similarities are seen in items seven and eight. Thus, these few items, to which perhaps Guilford's phrase "universally acceptable" might more properly be applied, are themselves capable of being narrowed down into even fewer general attitudes or behavior tendencies. It is scarcely to be thought that on this superficial and poverty-stricken list of traits would any clinician wish to base a test for the "diagnosis" of introversion or extraversion.

It is, of course, possible to permit greater latitude in statistical criteria for item "values" than has been previously indicated. Thus, in consideration of the averages established for item repre-

sentation in categories of the I-E scale (by judges' ratings), the following criteria were arrived at:[21]

1. Items represented in eight or less categories of the I-E "scale." (Average 8.17.)

2. Items for which the median value was equal to or greater than 1.75 (average).

3. Items for which the interquartile range was equal to or less than 2.23 (average).

By use of these criteria, 50 items could be chosen as "most consistently rated" of the total group of 195 items. However, only 23 of these items satisfied the "objective" criteria. The 14 additional items so derived (nine items previously listed) grouped for I or E tendencies were as follows:

1. Dislikes having people watch him.
2. Never leads at a social affair.
3. Usually quiet when in a social group.
4. Meditates a great deal.
5. Lets his thoughts drift into day-dreaming and reveries.
6. Has tendency to analyze his own thoughts and motives.
7. Is often troubled by his conscience even in matters of little consequence.
8. Emotions not freely or spontaneously expressed.

And for contrasting tendencies:

9. Prefers to work with many people around.
10. Tends to be a leader at a social affair.
11. Eager to express himself before a group; likes to be heard.
12. Participates actively in any conversation going on around him.
13. Finds it easy to confide in others.
14. If given time he could sell anything to anybody.

Again, redundancy of meaning and similarity of trait pattern are seen in associated items such as 2 and 3; 4 and 5; 6 and 7; and 10, 11, 12.

Lest it be thought that the writers consider the critical ratio or "diagnostic value" to be in itself the final yardstick for measurement of reliability or validity of use of test items, it should here be reiterated that no attempt has been made to break down the

[21] According to Methods and Results in Part II.

"extremes of reaction" or responses of "criterion groups" to determine whether constellations of traits may be thus found which will in some sense constitute differentiating criteria for introversion-extraversion, or some as yet unnamed or undefined consistently associated personality tendencies. This suggests, perhaps, a next step which may (in the light of this study) be properly undertaken only after the dimensionality of tests has been reduced by repeated administration to determine those items which most consistently differentiate between persons making extreme scores. Until that has been done, and factor analysis applied to the results of tests which more closely approximate an initial linear dimensionality, it would perhaps be scientifically more appropriate (though clinically difficult) to adopt an α, β, or x, y classification free from the stultifying connotations of past confusion as to introversion and extraversion.

The data presented here should be of special interest to students of personality and to those engaged in the clinical use of personality tests. The items chosen were representative of the best material from well-known commercialized tests. The fact that there is little or no relationship between empirical "diagnostic values" and theoretical "diagnostic values" means that frequently the trait patterns which are found in the individuals at the extremes of the I-E distribution may not be the same patterns found in the concepts of the clinician or educator as to what should constitute those extremes. It must be said in fairness to those who participated in the experiment that many clinicians engaged in the use and study of I-E tests hold only tentative concepts as to what the real functions of the tests are. Furthermore, the study gives us no measure of the degree of certainty which accompanied the classification of the items. Without doubt there were many who participated, although they felt that the concepts of introversion and extraversion were not sufficiently definite to warrant much certainty regarding their classifications. This latter point serves further to justify a wholesome hesitation on the part of the clinician or educator in assuming that anything very definite as to the personality characteristics of an individual will be indicated by his score on an introversion-extraversion test.

Summary and Conclusions.

1. An analysis of the literature on introversion and extraversion since the appearance of Jung's *Psychological Types* has revealed wide variation in the use of these terms. Confusion has furthermore arisen due not so much to re-definition as to erroneous restatements of original authors. Thus, the points of view of Freud and Jung have been confused and what is assigned to one may, at times, be found to be more distinctly associated with the other. Finally, the so-called traits of introversion and extraversion which are "measured" by questionnaire tests are assumed to be the same traits which Jung described, but Jung not only repudiates such a method but has described his Types so complexly that the application to them of concepts of linear continua becomes impossible.

2. In order to study the consistency of professional opinion regarding the traits of introversion and extraversion, 250 psychologists and psychiatrists were asked to classify items from representative I-E tests according to the degree of I or E the item seemed to express. An eleven point classification scale was used. Five gradations from mild to extreme were possible for both I and E with a theoretical neutral point midway between the extremes. The returns from 115 individuals support the following conclusions:

a. Competent judges frequently express grave doubts regarding the validity of the concepts of introversion and extraversion as they are at present used in clinical tests.

b. There appears to be considerable variation of opinion as to the traits described by test items. This is evident since approximately 90 per cent of the items were classified as descriptive of both introversion and extraversion (that is, they were found to be classified on both sides of the scale) and 97 per cent were classified with varying frequencies in the hypothetical neutral category.

c. The lack of clear-cut associations with either introversion or extraversion was evident since the average rating deviated from zero by only 1.74 steps of the scale.

d. Paired sets of ratings selected at random indicated agreement in only a very general way since the coefficient of correlation was found to be .672 with a standard error of estimate of ± 1.84.

c. No relation was found to exist between ambiguity value of an item and the deviation from zero of its average rating.

3. Critical ratios or "diagnostic values" were determined for each of the items used. This was done by administering the tests to large numbers of individuals and subjecting the results to an item analysis based on the "criterion group" method. A comparison of these critical ratios with the ratings of judges, by means of coefficients of correlation, revealed the following:

a. That there was little or no relationship between the critical ratios of the items and their ambiguity values.

b. That there was negligible correspondence between the critical ratio values and the deviation of average ratings from zero on the 11 point scale.

Interpretation of I-E test scores, it would seem, depends not only upon the particular test, but upon the variation in concepts which the individual testers bring to the scores.

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THE APPRAISAL OF INTELLECTUAL AND PHYSICAL FACTORS AFTER CEREBRAL DAMAGE IN CHILDREN.*

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There are numerous papers in psychiatric journals on the abnormalities of behavior following encephalitis and cerebral injury. As psychiatric information filters down to pediatricians we get the impression that the usual case is characterized by good intelligence, by impulsive and almost unpredictable behavior and by extraordinary hyperactivity.

In children's hospitals we see many children with outspoken cerebral damage. In general the pediatrician thinks of these children as having motor handicaps and mental defects. Presumably both impressions are correct and the differences of attitude are probably explained by differences in the clinical material under review. On the whole the pediatrician sees his patients on account of real or assumed physical disease, while the psychiatrist sees children who upset school routines or violate social conventions.

Under these circumstances it may be profitable to discuss a few cases which turned up in a children's hospital and were studied from the structural and the psychological point of view.

The Children's Hospital in Boston has space set aside for observation of children with disorders of behavior. The term is loosely defined so that various difficulties can be studied. Physical and psychological appraisal can be supplemented by efforts to teach and we have opportunity to follow up appropriate cases.

The cases we are reporting seem to us reasonably typical of the material which passes through an acute hospital. Without rigid

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physical and psychological appraisal certain of these children would have been subjected to stresses which they were not equipped to resist. We have no illusions about the difficulties which still face them, but we feel that we have a reasonably secure basis for outlining procedures. Gradually we are building up a body of information which is helping us to organize our ideas about the duration of convalescence after cerebral damage and about appraisal and management of children whose lesions are fixed.

By a leisurely procedure of this sort we hope to accumulate information which can be used in defining educational needs and in controlling social pressures. If this hope is based on reputable evidence we obviously have a contribution which is concrete enough to warrant discussion here. A few cases will illustrate the point of view and the method better than further discussion. Obviously a rather striking group with outspoken manifestations was selected. To this audience it must be apparent that the summaries are brief and that much more information has been collected than is included. Three points are worth emphasizing:

1. A very real effort has been made to find out relevant facts about development and to use this history in interpreting physical and psychological data.

2. Suggested changes in educational method have been subjected to trial in the hospital before being presented to the school and to the parents.

3. Ordinary neurological examination has been supplemented by encephalography in many cases.

CASE 1.—Prolonged convalescence after cerebral injury. A. B., No. 177920, an Italian girl of six was hit by an automobile on November 11, 1933. She was unconscious and was admitted to another hospital at once. She remained unconscious for several hours. X-rays showed no fracture and her parents took her home as soon as she recovered consciousness. For two days she did not talk and for four weeks she did not walk well and her right leg was weak.

In spite of increasing physical strength she was still irritable, cried frequently and was easily tired. She was admitted to The Children's Hospital eight weeks after the accident, on January 8, 1934. No physical signs suggesting cerebral injury were found. The usual X-ray and laboratory evidence was negative. The child was then transferred to our ward where activity, response to attempts at guidance and so on, could be observed.

There a new set of facts was revealed. Irregularity of reaction to various stimuli was evident. Obviously the child's response to psychological tests was

influenced by her emotional state. Her intelligence quotient was 98, but careful comparison of her behavior at the hospital with that reported before the accident suggested that she was not as competent as before and this evidence made us cautious about prognosis. We discharged her after three weeks under careful supervision as a convalescent.

In April, 1934, five months after the accident, she was returned to the hospital because she was irritable, sullen and "squirmed and wriggled" in school. She drooled and speech was at times quite unintelligible. Physical examination showed typical extrapyramidal motor disturbances. The consensus of opinion was in favor of regarding this disturbance as the result of the injury rather than as an incidental attack of chorea. Encephalography showed no evidence of gross cerebral changes. Further psychological studies suggested that the child, over a period of six months, had not shown progress enough to warrant optimism about the future.

For the next three years the story is one of difficulty in management. Away from home she does fairly well and is getting along with minimal concessions in school. Attempts to keep her at home failed. The family is large and economically inadequate, but tolerant and eager to help. Under these circumstances she becomes difficult to manage and has uncontrollable tantrums.

The present situation three and one half years after the accident is that the child does fairly well in a tolerant foster home; her psychological status is reasonably adequate, but her I. Q. of 98 does not fit in with her mediocre achievement at school. She cannot be handled at home.

If our interpretation of this series of events is correct, we are dealing with prolonged convalescence from cerebral injury. It seems reasonably clear that without careful handling the child would be exposed to stresses and misunderstandings which might well produce the characteristic behavior which is so often described. The maintenance of suitable arrangements is expensive and complicated and can be justified only on the theory that the child is still capable of improvement. It is entirely likely that the pattern of behavior of this child is more or less set by its original endowment and its early environment. She is one of a large family living in crowded quarters. A considerable amount of casual combat can be assumed as inevitable. It may well be that her present pattern is merely one of exaggeration of her usual one.

CASE 2.—Petit mal, behavior difficulty and various symptoms depending on gross, but unrecognized cerebral lesion.

C. D., No. 99844, a girl of 5½ months, was first seen in the Infants' Hospital for vomiting in October, 1926. No suspicion of a neurological disorder was aroused. In 1932, the child returned to The Children's Hospital at six years of age with a story of nausea and attacks of rigidity. She was doing well in school and the out-patient physicians were not impressed by the story and suggested the possibility of hysterical attacks and oversolicitous management. It was finally decided to proceed on the basis of petit mal attacks Out-patient supervision was continuous and several excellent clinicians examined the child without suspecting that any gross cerebral lesion existed.

At 8½ years of age she was admitted to the medical wards on account of abdominal pain which occurred in paroxysms associated with sharp headaches. At that time the child was in the fourth grade. Her behavior was that of the ordinary child of her age except that, owing to illness, she had been indulged and was somewhat dictatorial. Psychological tests revealed an I. Q. of 110 and it was felt that her adequacy was consistent with this finding. She was discharged after a period of observation during which she seemed reasonably comfortable, and was sent back to the out-patient clinic.

In March, 1936, at 9 10/12 years she was admitted to our service because she was having vague periods of disorientation with headache. The initial study revealed no evidence of motor disturbance, but we agreed that the severity of the symptoms, unexplained by a careful study in the medical wards, justified encephalography. The gross deformity of the ventricular system and the asymmetry of the brain are evident. Even after knowing this situation we had great difficulty in eliciting signs of motor disturbance. In order to rule out a possible subdural hæmatoma, burr holes were made and the dura inspected. A small piece of thickened membrane and underlying brain was excised. No evidence of any acute process was found and a tentative diagnosis of "Gliosis, probably congenital in origin" was made by the pathologist. *Gross description:* "The specimen consists of a small piece of tissue 1 cm. in length, pinkish-white in color, and of a soft consistency. It is grossly meshlike in its finer construction and shows no inflammatory reaction. *Microscopic:* Three sections stained with H. & E. Pt. A. H. and aniline blue. There are several blood vessels which show no unusual features. The tissue is composed of a network of neuroglial cells with their fine delicate fibers forming a dense meshwork. In some areas processes can be followed to the two extremities of the cell body giving the structure of a piloid astrocyte. There is some interstitial connective tissue in the region of the blood vessels which is composed of cells with rather dense collagenous bundles. About these the glial cells often assume a radial disposition. There is no evidence of inflammatory infiltration, but the change is essentially one of the gliosis."

With this evidence in hand the management of the child could be carried on with some confidence. Without such evidence, recurrent discussion of management was confused and indecisive It is quite evident that there are no disorders of behavior of consequence, beyond those which can be easily referred to the uncertainty of management which is inevitable where medical confusion exists.

Case 3.—Mental defect as a result of subdural hæmatoma. E. F., No. 164472, aged 11 months, a girl, was brought into the Infants' Hospital on September 2, 1932, 4 days after a fall from a hammock to the floor of an automobile. She did not lose consciousness at the time, but ten hours before entry had a right-sided convulsion. At intervals the attack recurred and she was admitted in a convulsion. An immediate lumbar puncture showed normal fluid under no increased pressure. (120 mm.) The child's temperature was 104° at entrance and after a few days she developed a cellulitis of the leg. The convulsions stopped, but a right hemiparesis persisted. Further immediate

study of the intracranial situation was blocked by the sepsis which persisted for several weeks. When the general condition of the child warranted further interference we searched for a subdural hæmatoma which was found and evacuated on the left side.

The psychological status eight weeks after the accident was interesting and important. Dr. Lord's note on November 9 when the child was 13 months, is as fololws: "Child seems more like nine than a twelve months' baby. She is alert, responsive and fairly persistent like a normal baby, but although she uses her left hand promptly and efficiently in securing toys, she is definitely less competent than the average in situations that demand more deft manipulation. Question of immaturity or defect following injury; impression the latter. Mental development 9-12 months."

The encephalogram at this period shows asymmetry, but no important displacement of the ventricular system.

On the whole we had a feeling of some optimism about this child since we had evidence of real merit that intracranial pressure had not been high soon after the accident; that the hæmorrhage had not extended beyond the subdural space and that surgical intervention had evacuated the hæmatoma. We hoped to see steady improvement, and felt justified in regarding convalescence as still in process. She was discharged to her parents in another city six months after the accident.

In January, 1936, at 4 3/12 years, she was again admitted. Her story was reasonably uneventful until about six months before reentry when she developed frequent outbursts of temper. She was particularly likely to have these attacks while playing with other children. At about the same time episodes of falling and then being unresponsive occurred from time to time. On one occasion she had a frank rightsided convulsion. On entrance the child had an obvious, though not severe, hemiparesis She spoke clearly and used sentences, but was distractible and very difficult to handle. The various tolerant people who were responsible for her care regarded her as over-active, uncontrollable and a genuine peril. The relatively fragile restrainers which are used in the hospital were completely inadequate.

Psychological study is summarized as follows: "At the age of 4 3/12 years the child talks very little but occasionally she makes a spontaneous comment or answers a question up to three-year standards. She also enjoyed matching shapes and colors, but she had less success with blocks and crayon. Under favorable conditions child reacts like a three-year-old, but her response is variable and unpredictable under any stress. Mentally defective (rating below 70)."

It seemed to us reasonably clear that this child was now beyond the convalescent state. The mental status was inadequate, the behavior was not controlled by any measures taken by the family and we could not control it acceptably in our hospital. She was having occasional convulsions. An encephalogram and a puncture through the burr holes, made three years before, revealed no evidence of reaccumulation of fluid. There is obvious distortion of the ventricular system with a migration of the system to the damaged side. It seemed clear that the desperately unsatisfactory state of the child was permanent and the parents were so advised.

CASE 4.—Prolonged convalescence after cerebral trauma. G. H., No. 205593, at the age of eight years was a vigorous, competent girl, above the average in school and obviously well adjusted in an admirable family. At that time she was injured when the car in which she was riding turned over. She was removed from the wreck, unconscious, limp on the right side and with clonic movements on the left side. She was taken to a hospital where she remained in a convulsive state for three days. Lumbar puncture and X-ray studies were negative. She remained in coma for ten weeks and then gradually improved.

Eight months after the accident, she was brought to Boston to see Dr. Stanley Cobb and was later referred to us at the Children's Hospital. Her physical signs were striking. She could not walk alone. She had very marked difficulty with coordination on the right side and moderate spasticity on the left side. There were various occulomotor palsies and nystagmus. Her speech was slow and difficult but entirely intelligible. Without going into further detail it seemed clear that the motor signs suggested a diffuse injury with an extraordinary amount of brain stem damage

The intellectual and emotional elements were of even greater interest than the unusual physical signs. Both the child and the mother recognized that she was unable to handle new mental problems as she had before the accident. However, it was easy to carry on a conversation with her, to get accurate answers to questions and to gain an impression of mental competence. Making allowances for fatigue, for motor disturbances and for shyness, everyone tended to regard her as adequate. Her intelligence rating by the Stanford Binet tests was in the 90's, although careful study of the material revealed difficulties greater than the rating suggested. When a careful review of her status before the accident was made, it was evident that she had by no means recovered.

Fortunately it has been possible to keep this child under observation since September, 1936. During this period the ocular difficulties have become less and we do not feel that she is now seriously handicapped from that point of view although she still needs large print. The motor situation is slowly improving, she walks with minimal support and can write with difficulty, but effectively with her left hand. She is still spastic on the left side and very tremulous and incoordinated on the right.

We have evidence that the child at the time of the accident, when she was 7 8/12 years of age, was decidedly superior, according to clear statements of the mother, who is a close and critical observer. The child wrote an operetta which was produced at school; she wrote correct and humorous poems and she dealt effectively with short division. All sorts of other examples of her superior ability are available. At the present time the child has a mental age, by the Stanford-Binet test of 8 6/12 years, giving her an I. Q. of 92, in spite of the severe motor handicaps. She meets the daily routine of the ward with considerable poise, courage and occasional flashes of humor. During the past few months she has dictated a simple play and several new poems.

The question obviously arises as to intelligence, and it cannot be answered easily. Certain aspects of her behavior are highly intelligent but her learning

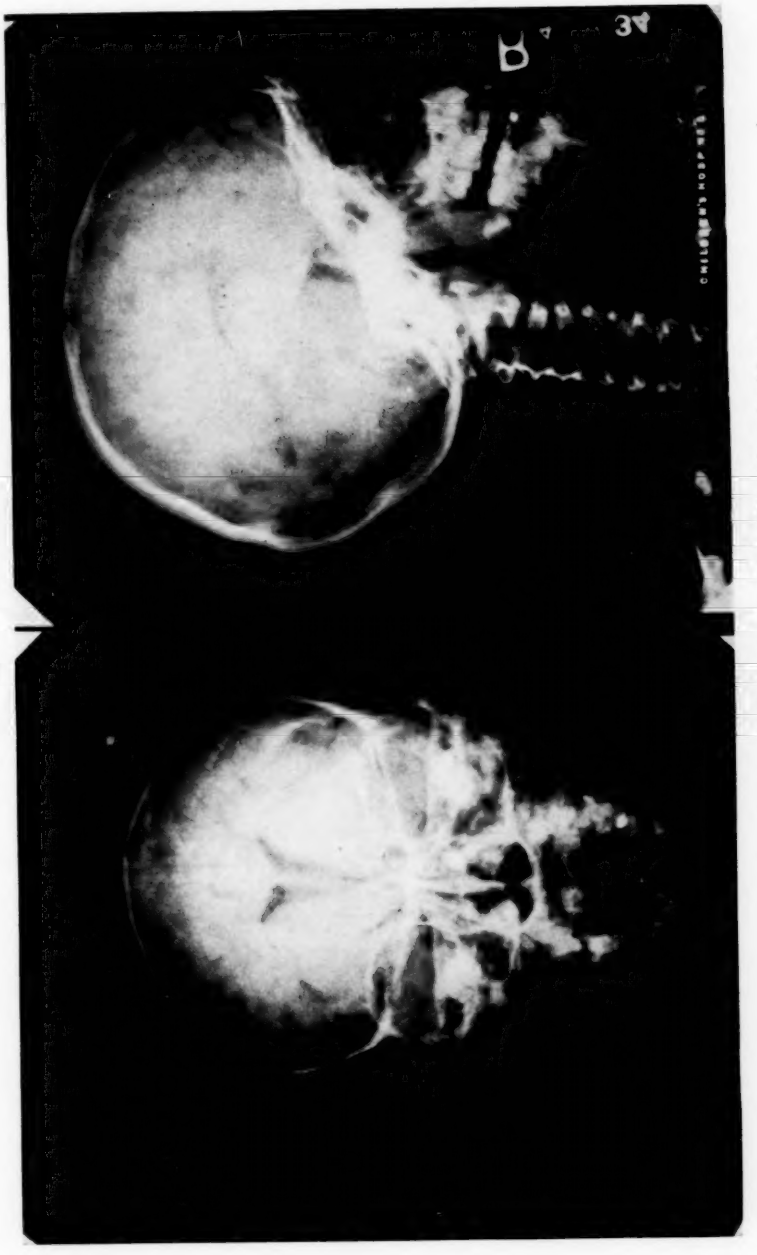


FIG. 1.—Case 1. Encephalogram 5 Months After Accident.



FIG. II.—Case 2. Encephalogram at 9 10/12 Years.



FIG. III.—Case 3. Encephalogram Before Evacuation of Subdural Hæmatoma, 2½ Months After Accident.

Fig. III.—Case 3. Encephalogram at 9 10/12 Years.

Fig. III.—Case 3. Encephalogram Before Evacuation of Subdural Hæmatoma, 2½ Months After Accident.

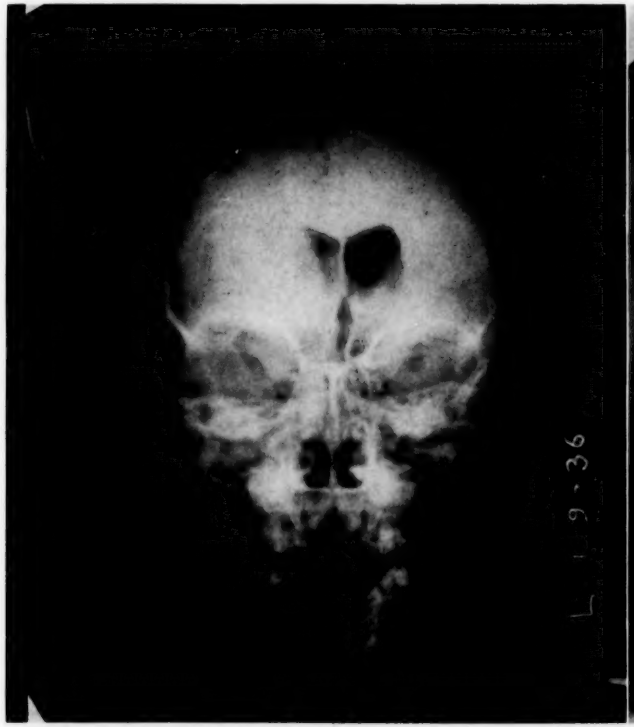


Fig. III.—Case 3. Encephalogram 3 4/12 Years After Accident.

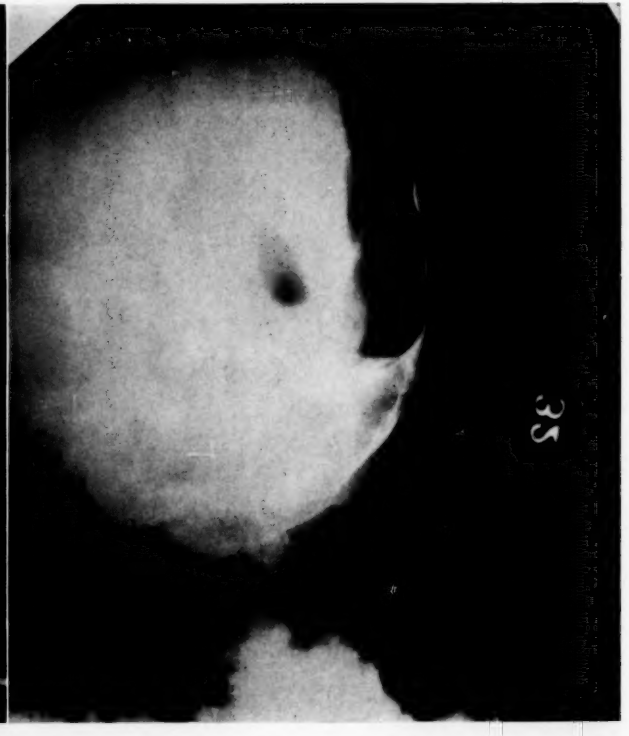


Fig. III.—Case 3. Cavity After Evacuation of Subdural Hæmatoma.

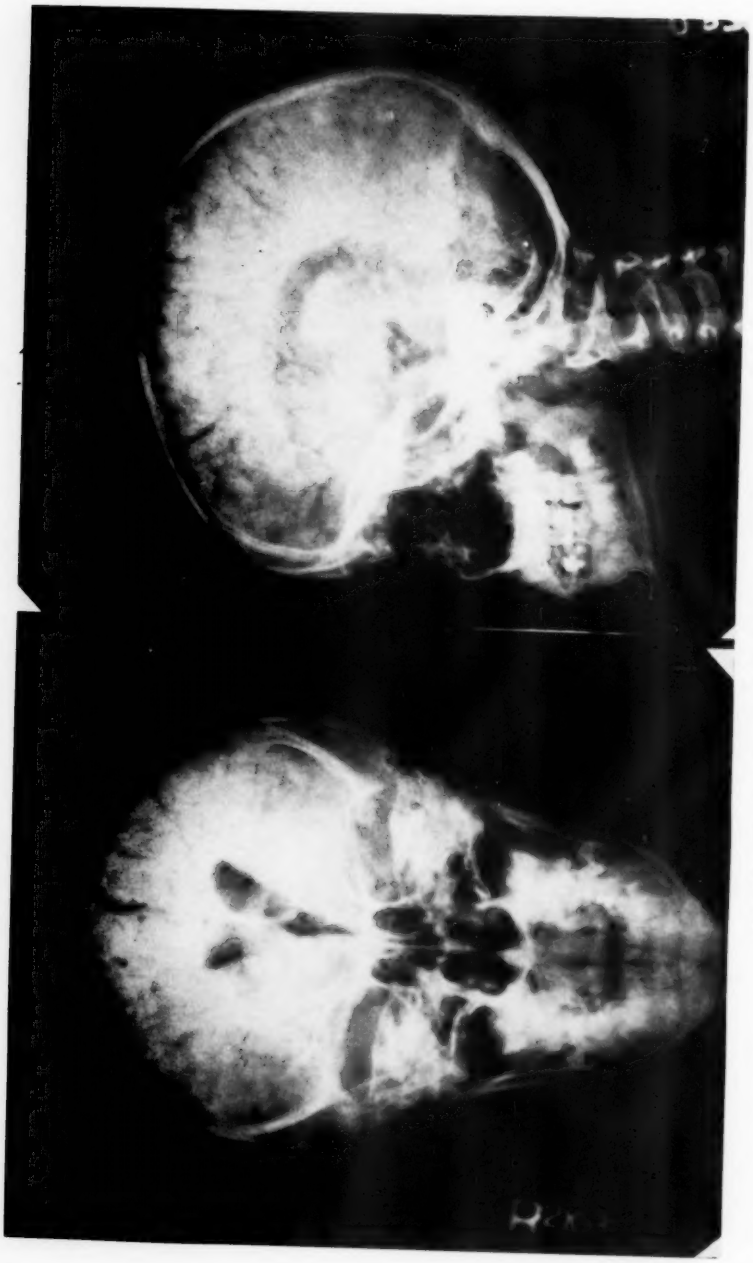


FIG. IV.—Case 4. Encephalogram 15 Months After Accident.

capacity is seriously impaired. This impairment of course can be evaluated only by reference to her previous superior status.

At the present time there is evidence of serious impairment in memory and in her ability to control associations. For instance, any interruption will make her forget what she has planned to write. She could not remember that she had finished her play, although she took great pleasure in writing it. She is very forgetful about various facts in relation to numbers. Periodic re-testing at two month intervals demonstrates gain in mental vigor. She can work for longer periods without fatigue and she grasps more complex situations. This growth of power is certainly striking and the question is whether she is still convalescent in the ordinary sense of the word.

Our feeling is that she is reasonably adequate emotionally; that she is socially responsive and gives a superficial impression of adequate intelligence, but that she has defects in memory and in power of controlled associations which may persist over a long period. It is perfectly clear to all observers that steady improvement is taking place. All of us feel that protection from pressure, both physical and intellectual has had an important part in her recovery so far. We believe that convalescence has been essentially spontaneous. For the present we are protecting the child from stress, as far as we can. We are avoiding situations in which her inadequacy will stand out.

An encephalogram done in February, 1936, fifteen months after the accident shows moderate enlargement of the ventricular system and a good deal of air over the cortex. We are reasonably sure that this finding justifies the conclusion that there is definite loss of tissue, particularly great around the third ventricle.

She has very clear insight into her difficulties and is troubled by her inability to cope with intellectual problems which were easy for her to manage two years ago. It is striking, however, that she is not in the least hard to handle and is emotionally stable. Naturally she has periods of discouragement but certainly they are not extreme now.

It is very difficult to summarize our present attitude towards this child, but the following discussion gives some indication. The facts upon which all observers agree are:

1. The child has not yet reached the level of intellectual competence at which she stood nearly 2 years ago.

2. She is steadily improving, though irregularly.

3. She has none of the stormy emotional episodes which are so often noted in children after accidents.

Prognosis is admittedly difficult. One individual refuses to talk in terms of recovery until evidence justifies the conclusion that the child has surpassed the level attained before the accident. Another speaks of prolonged convalescence and a third thinks there is a possibility of eventual normal mental growth.

It seems to us clear that differences of opinion of this sort are inevitable and might well be disastrous. By intelligent utilization of medical and educational machinery, it is possible to avoid most of the difficulties. We have

been able to adapt our routine to the increasing capacity of this child. As far as we know the improvement is continuous and progressive, but we feel quite sure that a resolute determination of the teacher, the physiotherapist and the rest to avoid pressure at all costs, is the greatest contribution they have made.

We have proceeded on the theory that we have been dealing with prolonged convalescence and that the major duty of therapists in convalescence is willingness to proceed at the rate set by the process of recovery. We have been able, so far, to keep the obvious conflicts of opinion about ultimate prognosis from confusing the management of the child.

SUMMARY.

Obviously we do not present these cases with any feeling that they settle anything, but merely to indicate a method of appraisal which seems to us worth while. In the first place, we have come to the conclusion, which is, of course, nothing new, that accurate psychological study is just as likely to indicate the existence and the extent of cerebral injury in childhood as is physical examination.

Second, considerable defects of brain tissue can exist with minimal physical and psychological changes. On the whole, we are reasonably sure that encephalography is a tool which can be intelligently used in many dubious cases where decisions are important.

Third, it is our impression from the observation of cases of this sort over a number of years, that the period of convalescence is frequently prolonged, so that it is quite possible to subject the convalescent child to stresses which are harmful.

We have no data which suggest that there is any direct correlation between the severity of the injury as demonstrated by encephalography and the disorder of behavior. On the whole we are inclined to believe that gross evidence of cerebral damage is hard to collect in the typical " post-encephalitic " and " post-traumatic " behavior disorders.

It is suggested, more for the purposes of argument than as a statement of fact, that the children whose brains are grossly damaged are protected during convalescence by the very nature of their disabilities, while the less obvious lesions do not produce symptoms which lead to protection.

DISCUSSION.

DR. GROVES B. SMITH (Godfrey, Ill.).—I feel that we have come a long way with the fact that now we have some definite evidence of what has gone on through our encephalographic findings. When I first became interested in these problems in St. Louis, in 1920 at the Children's Hospital, we used to see them and we didn't know where we were going with them. In a child that I saw about eighteen years ago we recognized that there was this disturbance in personality. Recently the young man was sent to a reformatory because of a fourth attempt at rape. So we can see there is some definite correlation between injury and disturbance in some of these higher centers. We recognized there was something wrong at that time, but we couldn't put our hands on it.

The outstanding findings of importance are the degree of restlessness, the alteration in behavior and not in the intelligence. One of the most important Dr. Crothers has emphasized, and that is the importance of an accurate localization in diagnosis, not only neurologically but also psychologically.

In a period of five years, I had an opportunity to see a large number of these children in a general hospital service where they came in acutely affected; in certain of the cases we found right after the injury definite evidence of neurological change. When you saw that same child five years later, even those very, very minor reflex changes had entirely disappeared, and if you were asked to evaluate the child after that interval of five years, you would have said there had been no neurological damage. To me there are only two solutions to the problem; first, an increasing education along the line which Dr. Crothers has emphasized, that in every general hospital there should be correlation between the pediatric and the neurological staff. I don't think any of us from the psychiatric standpoint have very much we can offer at the present time, because we haven't been able to correlate these findings well enough. I think that is a thing which will come as time goes on.

I feel that we are indebted to Dr. Bond and the others in their post-encephalitic studies, because of the emphasis of how we can alter behavior patterns in those who have actual structural damage due to inflammation. I think that same thing is true in these cases where there has been actual structural damage so far as injury is concerned.

There is no question but that a great deal of this behavior resides within the family circle. I feel that in the beginning all these children should be removed. Unfortunately from the economic standpoint we can't remove them for four or five years at a time, but during the past year I have seen four children in whom had they been removed over a period of a year, a great many of these behavior difficulties and the formation of abnormal mental behavior patterns could possibly have been avoided. The oversolicitude of the parents during the actual illness is one factor.

We find in the majority of these children there is this abnormality of behavior which the average parent doesn't understand.

Another point which I feel is of primary importance in general practice is that in each one of these cases where the injury is associated with compensation aspects, the family cannot dissociate themselves from the fact that there is something to be gained by having the child sick until after there has been a definite settlement of the case. That is not true in the larger hospital practice, but it is an extremely important factor in the general work with which the average physician comes in contact.

The emotional and the intellectual bloc I don't think has any definite bearing as to whether there has been a major fracture. I think oftentimes the emotional bloc, the disturbance in the higher centers of judgment, the disturbance in the higher centers of association are greater in those cases where you cannot demonstrate any definite neurological findings. In other words, the injury has been one which has been diffuse throughout the entire brain tissue.

I want to emphasize that rest and more rest and more observation are important, and I don't think we have much else to offer. We appreciate the frankness with which Dr. Crothers has laid these difficulties before us, and I in turn can say after watching a great many of these children over 20 years, I know less than he does about it.

Dr. Lloyd J. Thompson (New Haven, Conn.).—The arrangement on the program of the paper on reading disabilities plus Dr. Crothers' paper leads me to bring up a question that Dr. Crothers didn't touch upon, but I have heard that he has something to say on this subject. I must preface my question by a few remarks from experience.

Last fall, after being away for a year, I returned to the clinic where I had been working for a long time, and in the first month, three of my old cases came back. They were postencephalitic boys, with definite hyperkinesis. I had seen them before and made that diagnosis some years ago I was rather startled to find in all three of them there was a definite, specific reading disability. Then in the next month or two, another three or four of these cases that I had seen before came in and the same thing was found; perhaps in one or two of them it wasn't a specific reading disability, but it was evident that there was some disturbance along, should we say, Dr. Orton's line, some strephosymbolia disturbance. Then I went out looking for more cases and called in some of the old ones that I had known and collected ten cases that were definitely of the postencephalitic type—not all of them due to encephalitis, one or two to head injuries, one I think to birth injury—but they all showed this, as Dr. Kahn has called it, organic drivenness and there was evidence of other organic disturbance in the central nervous system. In those ten, there was some disturbance, some special disability, sometimes a mix-up in the question of dominance, eye dominance. Very often, as Dr. Miles, who corroborated my findings with her psychological tests showed, there was some visual motor disturbance. Well, that was almost too good a story. Last week I got hold of another one and I couldn't find anything of that sort in him. But it led me to think perhaps the organic disturbance may be the real cause for some of the special disabilities that we see in this line.

At the same time we got about an equal number of children referred by the school system because of their reading disability, and in many of them there were hyperkinesis too, but not as much as these organic cases. I think that if this is really true, that is another field for treatment of these post-encephalitic conditions; that is, if they do possess these special disabilities, why shouldn't we be able to treat them along those lines also, and perhaps that would be another adjunct in our treatment of the postencephalitic cases.

DR. MAX H. WEINBERG (Pittsburgh, Pa.).—Dr. Crothers has raised quite a number of important questions. They comprehend legal phases, encephalitic pictures and then the question of treatment.

First as to the encephalitic picture, it seems to me that it is about time we recognize the fact that following injury we can get the so-called post-encephalitic picture. Osnato ten years ago coined the term traumatic encephalitis. He based it on the work of Kakaso, who found at least five cases in his autopsy material where pathologically practically all the phenomena that are found in encephalitis, including perivascular infiltration, existed. It is quite possible, particularly in youngsters, that we can get a picture resembling encephalitis.

As to the possibility of missing encephalitis, if I may take a few minutes to recite one case, a case reported in 1923 that I had at West End Hospital with encephalitis. One unusual feature about her was she had what the older writers used to describe as hemichorea. The girl was taken out by the parents, who were very uncooperative, while she still had a temperature of 103. I lost track of her, About six years later, she was brought to my dispensary with the history that in two clinics in this city and one clinic in Philadelphia, she was diagnosed as a behavior problem and finally a diagnosis was made of dementia præcox. By the time she came back to me, she had the typical post-encephalitic Parkinson syndrome.

You can see Dr. Crothers and I are not the only ones who have seen these difficulties, but they do occur all around. Curiously enough in that case, none of the clinics asked for a copy of our history of that case I had reported in the literature four years ago before this diagnosis was made.

As to head injuries, one of the most important points Dr. Crothers has raised is this child he reported with the minor injury, the one that fell from the hammock in the automobile, ordinarily without encephalography perhaps it would have been missed altogether.

We had a child only two weeks ago 14 months old brought to the hospital with a history that 48 hours after birth the child had developed a hemorrhage. This was the first time we saw it. The child showed lack of development, couldn't sit up, couldn't hold its head up. A neurological examination showed a slight rigidity in the left arm and leg, slight hyperreflexia and nothing else. That was the only thing we could find.

An encephalogram showed a marked atrophy and practically both hemispheres were withdrawn. There was a great deal of space in between. We are quite satisfied we do not know yet what brought on this hemorrhage,

whether it was forceps delivery or what, but we do know this child has a marked atrophy of the brain.

I must thank Dr. Crothers for bringing up these questions because it shows that we should never take for granted—and this is where the medico-legal angle comes in—the injury was minor, never in an adult and particularly never in a child. We should look for some trouble or other, and we are most apt to find it.

Dr. Oscar J. Raeder (Boston, Mass.).—Dr. Crothers has given the psychiatrists who treat mental conditions in children the idea or has enforced the point of acuteness of these conditions. Psychiatrists ordinarily take things slowly and chronically and wait until something comes, until something develops, or they don't get excited. But these cases that he demonstrates, as Dr. Weinberg also mentioned, are acute things and have to be taken quickly, taken before things happen. Something has to be done about them long before the ordinary advice of the psychiatrist is called in.

Secondly, when we get a pediatrist and a neurologist of this type to admit and show how difficult it is to get at the neurological conditions from the clinical point, as in this child where he could find no evidences of a hemiplegia, no reflex changes, when the child was examined, but later on showed definite evidence that here was a hemiplegia in the making and it wasn't recognized, it seems to me it is most important for this sort of information to be distributed.

Dr. Weinberg said we have all seen these things, but Crothers gets out and does something about them. I think if we could get this idea more widely disseminated so that clinicians, medical men in general and every general medical man who is a pediatrician in general practice, I am sure that a great deal of the after effects could be avoided.

Dr. Bronson Crothers (Boston, Mass.).—The chief point that we wish to make is a relatively simple one. We believe that if the physician who is consulted at the time of an acute cerebral injury follows his cases properly, he will find that convalescence is a very long process. We have evidence that critical psychological appraisal may reveal irregularities or even arrests of intellectual development which might be missed by parents or by busy teachers. In the presence of these difficulties unwise pressures might well be imposed.

If doctors required evidence of orderly and satisfactory development before discharging a child as recovered after head injuries, we believe that some of the serious "post-traumatic behavior disorders" could be handled more wisely at home and at school.

THE OTHER SIDE OF HALLUCINATIONS.

By JONATHAN LANG.*

Introduction.

Because of the subjective factors present in the experience of hallucinations, the patient obviously finds difficulty in considering them objectively and in reporting them with any degree of objectivity. Yet the report of the psychotic patient provides the basic data concerning hallucinatory phenomena.

As a schizophrene who, though he has experienced various types of hallucinations over a period of more than eight years, has still retained certain amount of intelligence, and who has some knowledge of general psychiatric literature, the writer feels that an account of the phenomena which he has experienced might be of some value. While he makes no pretense of having completely eliminated subjective factors, he has attempted to be as objective as the circumstances would permit. This account made, as it is, five or six years after the experiencing of some of the hallucinations, may contain some involuntary errors.

Part I. Phenomena.

CLASS I: AUDITORY HALLUCINATIONS.

A. *Simple.*—Simple auditory hallucinations were the first type of hallucinations to come within my experience. As they happened to me, they consisted of the hearing of a voice speaking from a point slightly above my ear. The voice spoke clearly in a soothing monotone. It possessed a locational factor as coming from an approximate point in external space. The voice uttered only a sentence or two on each occasion that it appeared. The voice claimed to originate from God.

B. *With Inanimate Reference* (Synchronized Personification).—A closely allied type of hallucination, which, however, did not occur until somewhat later, was the appearance of words synchronized with environmental sounds.

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* This is a fictitious name. The author of this article is a patient who first consulted me in February, 1937, at the age of 30 years. His psychosis, which is of schizophrenic nature, with both paranoid and catatonic manifestations, is said to have set in suddenly at the age of 23 years. He has had a partial college education, and has read a great deal. He is intelligent, and has included in his reading many works of psychology, both normal and abnormal. His description of his hallucinatory experiences, given in this article, seems worthy of being recorded in psychiatric archives.—Aaron J. Rosanoff.

The words were definitely formed and sometimes even were grouped to form short sentences, though the repetition of a single word was commoner. They seemed to originate from the locus of the sound with which they were associated. They were synchronized with the sound, *i. e.*, the words changed in volume with changes in the volume of the sound.

C. *With Human Reference.*—A third type of auditory hallucination which has fallen within my experience is that of auditory hallucinations which seem to be the product of actual human individuals. This phenomenon can perhaps best be depicted by a description of the first time I experienced it. I was one of four men at a bridge table. On one of the deals, my partner bid three clubs. I looked at my hand: I had only one small club. Though my hand was weak, I had to bid to take him out. My bid won. When my partner laid down his cards, he showed only two small clubs in his hand. I immediately questioned why he had bid three clubs. He denied having made such a bid. The other two men at the table supported him. There was no opportunity and no reason for the three of them to have been framing me. In actuality, he had not made a bid of three clubs despite the fact that I had distinctly heard him do so. Not only had the hallucination included a spatial component synchronized with man's position, but it had also duplicated exactly the vocal tones of the man. Furthermore, the man had actually declared a different bid at the time I had heard him bidding three clubs. This bid I had not heard. Somewhere along the line of my nervous system the words which he had actually spoken were blocked and the hallucinatory words substituted. This blocking of an actual stimulus as part of an hallucinatory complex is to me one of the most interesting and intricate aspects of the hallucinatory problem. It perhaps might be called the inhibitory or anesthesic factor of hallucinations.

Hallucinations with human reference are, at the time of their occurrence, impossible to tell from the actual speech of the person who seems to be making them. Sometimes the lack of relationship of the hallucinatory remark to the other conversation of the person, provides a clue to some form of deviation, but, otherwise, the person who experiences an hallucination of this type, receives no indication of its non-normal origin in the experience itself. Only a subsequent check with the person who seems to have made the remark, can provide a check as to the actuality of the occurrence. In some cases, this subsequent check even is of little value, for to the person experiencing it, the hallucination is actual experience over-weighing the subsequent testimony of the person who seems to have made it, since to the hallucinated person, the testimony may be a lie which the seeming originator of the hallucination may be making to conceal his former act. In my own case, the recognition of the non-normal causation of auditory hallucinations of this type, was made easy by the presence of checks of rationality with other conversation of the person seeming to make it, and because of the appearance, immediately after the event, of hallucinations without human reference which admitted that the factor producing them was responsible for the hallucination with human reference.

PSEUDO-AUDITORY PSEUDO-HALLUCINATIONS.

A. *Thoughts-Out-Loud.*—Because of certain points of similarity with auditory hallucinations, I myself, until recently, related the phenomena of thoughts-out-loud to auditory hallucinatory phenomena. Recently, consideration of an accompanying minimal tonus of the vocal muscles and of the ease with which the thoughts-out-loud slide over into automatic speech, has led me to the view that the phenomenon is in part rather to be classed as a "minimal compulsion."

Regardless of its classification, thoughts-out-loud has formed one of the two major factors of my psychotic symptomatology. First appearing during the latter part of the first month of the psychosis, it has continued throughout the eight years. In its original state, occurring only for short periods of only a few minutes in length, the duration of its occurrence spread rapidly. By the end of the second month of the psychosis, it spanned practically all the time that I was awake. Since that time, it has continued to maintain this extended duration.

As I have experienced it, thoughts-out-loud has appeared as a complex of phenomena rather than merely a group of verbal productions. In addition to the verbal productions, a minimal tonus of vocal muscles and a sensation of proprioceptive pressure also are present. In so far as there is any hallucinatory factor in the experience, the sensation of proprioceptive pressure probably provides it. This factor will be dealt with later.

The factor of the verbal productions of the thoughts-out-loud is of the greatest importance. It may be said practically to absorb the function of verbal productions of the individual. Except in actual social conversation with another person, verbal expression of the thoughts of the ego appears only in the thoughts-out-loud. The ego does not have a direct access to words. Besides the expression of the ego's thoughts, the verbal productions of the thoughts-out-loud present ideas foreign to the ego.

These two differing phases of the verbal productions of the thoughts-out-loud, have in general their own forms of expression. In respect to the phrasing of the ego's thoughts, two styles of construction take place the most frequently. These two respective styles correlate fairly highly with various orientations of the ego. When the ego has an overt orientation, as in reading or writing, or in observation of the environment, the verbal productions of the thoughts-out-loud take the form of a running presentation of verbals suited to the activity holding the interest of the ego, adding an occasional side remark addressed to the ego. For example, if the individual is reading, the thoughts-out-loud reproduce the words of the book the individual is reading, sometimes making a comment on a passage. When the orientation of the ego is more strictly introvert, as for example in reflection, the verbal productions often take the form of an imaginary conversation between the individual and some person with whom the individual is acquainted.

In connection with the expression of foreign ideas, the verbal production of the thoughts-out-loud usually take the form of monologues attempting to

persuade the ego to adopt a belief in the authority of the agent behind the thoughts-out-loud, and to accept a Messianic fixation. Attached to these monologues are expressions of the thoughts of the ego concerning the arguments. Another variant is the presentation of arguments seeking to persuade the individual to specific acts.

A special phase of the verbal production of foreign ideas which deserves attention, is the appearance of anticipations, *i. e.*, the prediction of external events by the thoughts-out-loud. While this phenomenon has been rare, it has taken place with sufficient frequency to have had a marked effect upon my ideas. To give an example: in mid-May, 1930, the thoughts-out-loud stated something like this, "Remember the name —— ——, she lived near you once. You will read about her death in the newspapers soon." Approximately two weeks later I did read about the death of a person of the exact name given whose address showed that she lived near where I had lived eight months previously. Another type of anticipation which proved accurate three times out of four appearances, was the prediction of the terminal game of the consecutive winning streaks of professional baseball clubs. A third type has been the forecast of the availability at the public library of popular books which have previously been unavailable.

It is impossible not to be influenced by the experiencing of such phenomena. Regardless of their social evidential value, they represent to the person who experiences them, proof of contact with some agent possessing sources of information broader than those of any factor of the human organism. The nature of his experience of the prediction satisfies the standard of proof of the individual to whom it occurs. To deny it, he must deny all the other data of his experience with which the prediction is inextricably interwoven. He cannot escape their implications.

Another important factor of the verbal productions of the thoughts-out-loud is the reference frequently made to the hallucinations. The thoughts-out-loud explain, justify, and sometimes even anticipate the hallucinations. This intercorrelation is particularly marked in connection with hallucinatory pains and will be dealt with in more detail in that connection.

The two phases of the thoughts-out-loud,—the presentation of the thoughts of the ego and the presentation of foreign ideas,—are not hard and fast categories. Elements of one are often mixed with elements of the other. Transitions between the two phases occur several times during the day. Commonly these transitions are made easily, the thoughts-out-loud tending to provide verbalization of the thought trends of the ego whenever the ego develops a strong orientation. However, sometimes the thoughts-out-loud continued to present foreign ideas despite the fact the ego is trying to engage in activities which demand words. Such a situation naturally involves conflict, and sometimes leads to the outbreak of hysterical rages.

CLASS II. VISUAL HALLUCINATIONS.

A. *Simple Stationary.*—While not so extensive as the pseudo-auditory pseudo-hallucinations, visual hallucinations have fallen within my experience

on a few occasions. Such examples as I have experienced may be roughly classified into simple stationary apparitions and into moving figures. The first of these classifications has been by far the more frequent. The type of material which has been presented has shown considerable variety. At an early stage, the appearance of colored flashes of light was common. These took the form either of distant streaks or of near-by round glowing patches about a foot in diameter. Another type which took place five or six times, was the appearance of words or symbols on blank surfaces. Closely connected with this was the occasional substitution of hallucinatory matter for the actual printed matter in books which I have been reading. On these occasions, the passage which I have been seeing has dissolved while I have been looking at it and another and sometimes wholly different passage has appeared in its place. In passing, mention may be made that the inhibitory or anesthetic factor must have been involved in this form of hallucination since at one time or another the actual stimulus must have been blocked. Still a further form of visual hallucinations that happened on two occasions was the appearance on a wall of the pictures of the heads of young women as though projected from a projection machine. These pictures were of women whom to the best of my knowledge I had never met.

B. *Moving Figures.*—The visual hallucination of a moving figure has in my experience been a distinct rarity. In fact, in its pure form, unassociated with other types of hallucinations, it has come within my knowledge only once. On this one time, it consisted of the apparition of a woman dressed in a white dress which seemed to be gliding down the street ahead of me one night before disappearing into thin air. The figure was definitely outlined. It was opaque: in other words, it must have included an anesthetic factor since having no real existence, it should not have blocked light radiations which nevertheless were blocked. The figure moved without any sound, though the night was quiet, and though it appeared within the zone where sound should have been heard.

CLASS III. COMBINED VISUAL AND AUDITORY HALLUCINATIONS.

A. *Synchronized Visual-Auditory Hallucinations.*—Another rarely occurring hallucination bearing a very close connection with purely visual hallucinations, has been a visual hallucination with suitable sounds synchronized by auditory hallucination. I have twice experienced this intricate phenomenon. Its first occurrence was during the third month of the psychosis, and may be labeled "the hallucination of the young lady." I was walking down the street on a bright sunny morning. The door of a house about 15 yards in front of me opened, and a young lady stepped out and started walking down the sidewalk in front of me. I recognized her as a woman whom I had previously seen coming out of the same house, but otherwise I did not know her. Every aspect of her appearance was exactly lifelike; her figure was perfectly three dimensional; it was opaque. And every time that her heels struck the sidewalk I distinctly heard the click of their contact with the sidewalk.

After the figure had kept ahead of me for about two blocks, I happened to look down; when I glanced up again, the figure had vanished. It had been passing a vacant lot, and there was no house for it to have gone into.

The second time that it took place, was some three years later. This second appearance involved the seeming seeing of a phantom street car. At dusk one evening, I was walking down a street which cut across a street car line about a block above the south end of the street car line. When I was about half a block above the street car line, a street car passed heading toward the end of the line. The car had every appearance of an actual car. Its shape was three dimensional; it was opaque, except for its windows; it had passengers and crew; its trolley sent sparks flying from the trolley wire. In addition, I distinctly heard the rumble of its wheels as it swept past. Yet when I reached the street on which the car ran, and looked toward the end of the line where the car should have been standing, there was no car to be seen. Actually no car had passed. Two factors common to both occurrences may be noted. Firstly, as long as the hallucinations continued, they were indistinguishable from other factors of the normal external configuration with which they were perfectly integrated; it was only in the manner of their disappearance that they evidenced their non-normal origin. Secondly, they included the occurrence of a marked involvement of the anesthetic factor. In order for the hallucinations to have had opaqueness, a moving swathe of actual light radiations must have been blocked.

CLASS IV. HALLUCINATORY PAIN.

A. *Hallucinatory Pain.*—In my psychotic experience, a type of hallucination which has occurred with much greater frequency than visual or visual-auditory hallucinations, has been hallucinatory pain. With the exception of the thoughts-out-loud, hallucinatory pains have been experienced more than any other type of hallucinations. During the past eight years, not a single day has passed which has not been marked by at least a few samples. They have constituted the most malignant factor of the psychosis, and they have provided the factor which has proved the leading obstacle to attempts to cope with the psychosis.

To the person who experiences hallucinatory pains, the pains feel identical with actual pains. There is no difference between the sensation of hallucinatory and the sensation of actual pain. The person who experiences it can distinguish it only by its lack of normal cause and its interrelations with other hallucinatory phenomena. The person who feels it undergoes real suffering. The fact that the cause of the pain is obscure and abnormal does not reduce the actuality of the suffering. Rather, in so far as it makes more difficult the correction of the causative factor and the removal of the pain, it tends to add depressive factors which increase the suffering caused by the sensation itself.

To give some specific data concerning hallucinatory pains that I have experienced, it may be stated that they have varied considerably in intensity, in duration, and in locus. In intensity, they have ranged from slight irritations

to agonies. In duration, they have ranged from a fraction of a second up to 10 minutes or so. In locus, they have ranged over all parts of the body. In type, they have included smarting, burning and aching.

There has been a tendency for high intensity, short duration and repeated occurrence in the same organ to adhere together on the one side, and low intensity, longer duration and frequent shifts of location on the other. Until within the past year, the pains of high intensity and short duration were felt almost exclusively in the penis. During the past year the locus of this type shifted to the soles of the feet. The pains of lower intensity and longer duration change their location frequently, sometimes appearing in five or six locations in the space of an hour. The pains of higher intensity have tended to occur in a series of spasms, each spasm about a second in duration with an interval of from a second to four or five minutes between spasms. The pains of lesser duration sometimes last 10 to 15 minutes continuously. In connection with the latter type, it has usually been possible to produce a temporary cessation by rubbing the part of the body in which the pain is felt, or by moving the part violently.

The amount of pain per day shifts greatly. On one day there may be very little, only a few brief appearances of the pains of lesser intensity; on another, there may be considerable, several spasms of pains of higher intensity, and also several relatively long periods of pain of lesser intensity. The primary pains of higher intensity occur almost exclusively during moods of elation or relaxation; they very seldom take place during depressed moods. Secondary, lesser pains happen in all moods. When pain is feared and expected, the pain seldom arises.

There is a tendency for the amount of pain per diem to rise and fall in waves and for the waves to vary in their maxima. In general, there has been a tendency for an annual maximum sometime during the summer, with a secondary high during winter, and lows in fall and spring. There have, however, been some marked exceptions to this general scheme.

From the very start, there has been an intricate interrelationship between the hallucinatory pains and the thoughts-out-loud. The hallucinatory pains first appeared at a time when the ego was developing a doubt of the claim of divine authority made by the thoughts-out-loud, and their occurrence was explained by the thoughts-out-loud as a penalty for the doubt. On several occasions since, pains have occurred following threat by the thoughts-out-loud that they would take place if commands made by it were not obeyed. The thoughts-out-loud takes cognizance of the pains, speaking about them and trying to explain and to justify them. During a four-month period two years ago, long involved arguments attempting to justify the pain, formed the major factor of the foreign aspect of the thoughts-out-loud. On a few occasions, the thoughts-out-loud have correctly anticipated moves of the pain from one locus to another, the anticipation having been made immediately preceding the shift. On other occasions, however, the forecasted shifts have either not been made at all, or have been to some locus other than that predicted by the thoughts-out-loud. Sometimes the thoughts-out-loud

have briefly anticipated the start of a series of spasms of pain. Commonly, though, the pains start without any immediate warning.

Among a few other points concerning hallucinatory pain which might be mentioned, the point that it is felt as pain coming from some definite, specific sector of the body, should perhaps be stressed. In my own case, it is experienced as a distinct sensation coming from a definite peripheral zone. The exact bounds of the area are usually hard to define precisely. My general impression is that the pain seems to have an epicenter in one specific point or group of points in the zone, and radiates from this center. The pains have occurred in every posture or state of movement, though they have been most frequent while lying down or sitting down. They have taken place at all times of the day, with the greatest frequency at night while I am lying down on a bed.

CLASS V. MISCELLANEOUS HALLUCINATIONS.

A. *Proprioceptive Pressure.*—The only other hallucination which has taken place with any frequency is that of proprioceptive pressure which has already been mentioned as a factor of the thoughts-out-loud complex. It occurs generally in one of two states: (1) static, or (2) vibratory. In the static phase, it usually consists of feeling of pressure upon the back of the upper part of the head. The vibratory phase appears as a wave passing between two poles: commonly, one is at the back of the upper part of the head, the other, near the mouth. The waves seem to vibrate rhythmically from one pole to the other. For what it may be worth, I might say that on three occasions, while I have experienced the pressure vibrations, I have felt my pulse, and I have seemed to notice a correlation between the pace of the pulse and the rhythm of the pressure.

B. *Olfactory Hallucinations.*—Other types of hallucinations have taken place very seldom. On a few occasions, I have experienced olfactory hallucinations. These have consisted of the seeming smelling of an odor as though originating from a source just outside the nose. Sometimes this odor has had a symbolical relationship with the thoughts-out-loud, as for instance, the appearance of an odor of sulphur in connection with a threat of damnation to hell by the thoughts-out-loud.

C. *Kinesthetic Hallucinations.*—On one occasion, I experienced a very interesting example of a kinesthetic hallucination. I had gone down to a beach to attempt suicide by drowning. I poised on the edge of the pier. Then I tensed and jumped off. I felt myself falling through the air. I looked down to see how close I was getting to the water. I found that in actuality I had never jumped and was still standing stolidly upon the pier. I gave up for that night and went home.

CONCLUSION.

In closing a description of the hallucinatory and allied phenomena which I have experienced, certain general points should be stressed. Perhaps the

most important of the general factors is that hallucinations and pseudo-hallucinations form aspects of experience to the conscious self (or the awareness factor) of the individual to whom they occur. They appear in the conscious field as organized configurations. The conscious self does not anticipate them or initiate them. The intricate organization of the hallucination—the selection of the specific sensory pattern and its stimulation, the inclusion of specific locational factors, the anesthesia for conflicting factors of the actual external configuration—all take place before the hallucination appears in the conscious field. This is particularly true of the verbal production of foreign ideas by the thoughts-out-loud: the conscious self has nothing more to do with the complex organization of the intricate verbal patterns presented to it by the thoughts-out-loud, than it has to do with conversation addressed to it by another person.

A second important general factor is that hallucinations appear spontaneously. They do not grow out of phantasy present in the conscious field: they often do not even correlate in any way with the configuration of the conscious field existing at the time of their impact. This is particularly true of hallucinatory pains. The hallucinations appear without decision, preparation or anticipation in the conscious field. Another important general factor is that in connection with auditory, visual, visual-auditory, pain and olfactory hallucinations, there is a distinct stimulation of the exteroceptive division of the nervous system identical in kind with that produced by normal external stimuli. A fourth important general factor is that the conscious self is unable to produce stimulations similar to those presented in the hallucinations. Though I have tried the experiment on at least 50 to 60 occasions, I have never succeeded in producing a stimulation of the sensory nervous system.

To sum up: from the viewpoint of the patient, hallucinations are pre-existingly organized stimulations of the sensory nervous system which the conscious self neither initiates nor anticipates, but which form for it merely aspects of experience.

A REVIEW OF THE RESULTS FROM THE EMPLOYMENT OF MALARIA THERAPY IN THE TREATMENT OF NEUROSYPHILIS IN THE FLORIDA STATE HOSPITAL.*

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Since 1931 malaria therapy has been routinely employed in the treatment of selected cases of neurosyphilis in the Florida State Hospital. During the period of 5 years subsequent to its introduction, 210 patients in this stage of lues have been admitted to the service. At the time of writing, at least one year has elapsed since the discharge of the last series of patients included in this total, an interval sufficient to permit conservative examination of the results, especially from the standpoint of the duration of the resulting remissions.

Failure of the malaria inoculation to take occurred in 20 instances, a circumstance probably attributable to a previously acquired immunity. For various reasons these patients were not re-inoculated with other strains or species of parasites. Of the 190 successful inoculations, 144 were naturally induced by the employment of infected mosquitoes, and 46 were artificially induced by the intravenous inoculation of infected blood. The technique for the inoculation with and management of naturally induced malaria has already been adequately described. (1), (2). Local strains of all 3 of the common species of human malaria parasites have been employed.

The group of 190 patients includes 139 whites and 51 negroes. At the time of inoculation 33 of these were below 30 years of age, 115 were between the ages of 30 and 44, and 42 were above 44.

In the subsequent tables, all patients are grouped in 4 categories according to their status in May, 1937. Those classed as remis-

* The studies and observations on which this paper is based were conducted with the support and under the auspices of the International Health Division of The Rockefeller Foundation, in cooperation with the Florida State Board of Health and the Florida State Hospital.

sions presented such a degree of improvement that their dismissal from the hospital on furlough or discharge was possible. Patients classed as improved showed varying degrees of improvement from their condition on admission. All of these however were still in this hospital or other institutions. Several showed improvement comparable to those in the prior group, but furloughs for them were impracticable because of the lack of guardians. The unimproved group included those whose condition was stationary or who were deteriorating. The group of deaths included all who had died, up to the time of writing, regardless of the causes.

The malaria therapy was supplemented by routine chemotherapy, given either before or after the malaria attack, while some patients received chemotherapy both before and subsequent to the malaria attack. The 20 patients who did not respond to the inoculation also were given chemotherapy. In 32 of the more recent cases receiving malaria therapy, the routine chemotherapy was supplemented by courses of tryparsamide.

The results from malaria therapy according to the race of the patient and the species of parasite employed are presented in Table 1.

Remissions were highest after the employment of quartan, but conversely, the greatest proportion of patients classed as deceased was among those inoculated with this parasite. *Vivax* was largely employed in the inoculation of white patients and *falciparum* in the inoculation of colored, a circumstance that makes comparison of the therapeutic merits of these 2 species difficult. However, in comparing the two, the results from the employment of *vivax* appear more favorable.

Table 2 shows the results according to the method of inoculation.

It would not appear that the therapeutic results from naturally induced, as compared with artificially induced, infections with the strains of parasites have varied significantly.

In Table 3 the therapeutic results are considered from the standpoint of the number of malaria paroxysms experienced. For comparison there is introduced a column ("None") showing the present status of the 20 patients unsuccessfully inoculated (who received only chemotherapy) of whom 20 per cent experienced remissions and 45 per cent have died. Before the improvement observed can be ascribed to the malaria therapy, the results among

TABLE 1.

RESULTS FROM MALARIA THERAPY ACCORDING TO THE RACE OF PATIENT AND THE SPECIES OF PARASITE EMPLOYED.

Outcome.	Cases inoculated with P. vivax alone.						Cases inoculated with P. malariæ.						Both P. vivax and P. falciparum.		Cases inoculated with P. falciparum alone.				No.	P. c.
	Total.	P. c.	W.	P. c.	C.	P. c.	Total.	P. c.	W.	P. c.	C.	P. c.	Total (W.)	P. c.	Total	P. c.	W.	P. c.	C.	P. c.		
Remission	42	33.9	40	33.3	2	50.0	7	38.9	6	40.0	1	33.3	1	25.0	10	22.7	0	—	10	22.7	60	31.6
Improved	26	21.0	25	20.8	1	25.0	1	5.6	1	6.7	0	—	2	50.0	15	34.1	0	—	15	34.1	44	23.2
Unimproved	26	21.0	26	21.7	0	—	2	11.1	2	13.3	0	—	1	25.0	8	18.2	0	—	8	18.2	37	19.5
Died	30	24.2	29	24.2	1	25.0	8	44.4	6	40.0	2	66.7	0	—	11	25.0	0	—	11	25.0	49	25.8
Total	124	100.	120	100.	4	100.	18	100.	15	100.	3	100.	4	100.	44	100.	0	—	44	100.	190	100.

W = White; C = Colored.

patients who were successfully inoculated must be definitely better than among the group who did not acquire malaria.

Patients who had 11 or more paroxysms showed a remission rate of 31 per cent or better. The mortality was lower among those who had malaria therapy and definitely lower where the paroxysms exceeded 20 in number.

TABLE 2.

RESULTS FROM MALARIA THERAPY ACCORDING TO THE METHOD OF INOCULATION.

Outcome.	Naturally induced (Sporozoites).		Artificially induced (Trophozoites).	
	Number of cases.	Per cent.	Number of cases.	Per cent.
Remission	48	33.3	12	26.1
Improved	33	22.9	11	23.9
Unimproved	28	19.4	9	19.6
Died	35	24.3	14	30.4
Total	144	100.	46	100.

TABLE 3.

RESULTS FROM MALARIA THERAPY ACCORDING TO THE NUMBER OF MALARIA PAROXYSMS EXPERIENCED.

Outcome.	None.		1-10.		11-20.		21-40.		41 and over.	
	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.
Remission	4	20.0	12	24.0	20	31.7	17	36.2	11	36.7
Improved	2	10.0	14	28.0	11	17.5	13	27.7	6	20.0
Unimproved	5	25.0	9	18.0	12	19.0	7	14.9	9	30.0
Died	9	45.0	15	30.0	20	31.7	10	21.3	4	13.3
Total	20	100.	50	100.	63	100.	47	100.	30	100.

Since the severity of the paroxysms experienced may be a factor contributing to the benefits of the treatment, the results are considered in Table 4 with reference to the number of paroxysms experienced in which a temperature of 104°F. or higher was attained.

The results attained from those who did not experience any paroxysms with temperature of 104°F. were practically the same

as the present status of those whose inoculation failed (see Table 3). Definite progressive increase in the rate of remission and decrease in the death rate was observed as the number of paroxysms of this degree of severity increased. None of the patients who experienced 21 or more paroxysms with 104°F. died, and 62.5 per cent had had remissions. Comparing these results with those of Table 3, it would appear that the severity of paroxysms, rather than the number, determines the character of the therapeutic results. (See chart.)

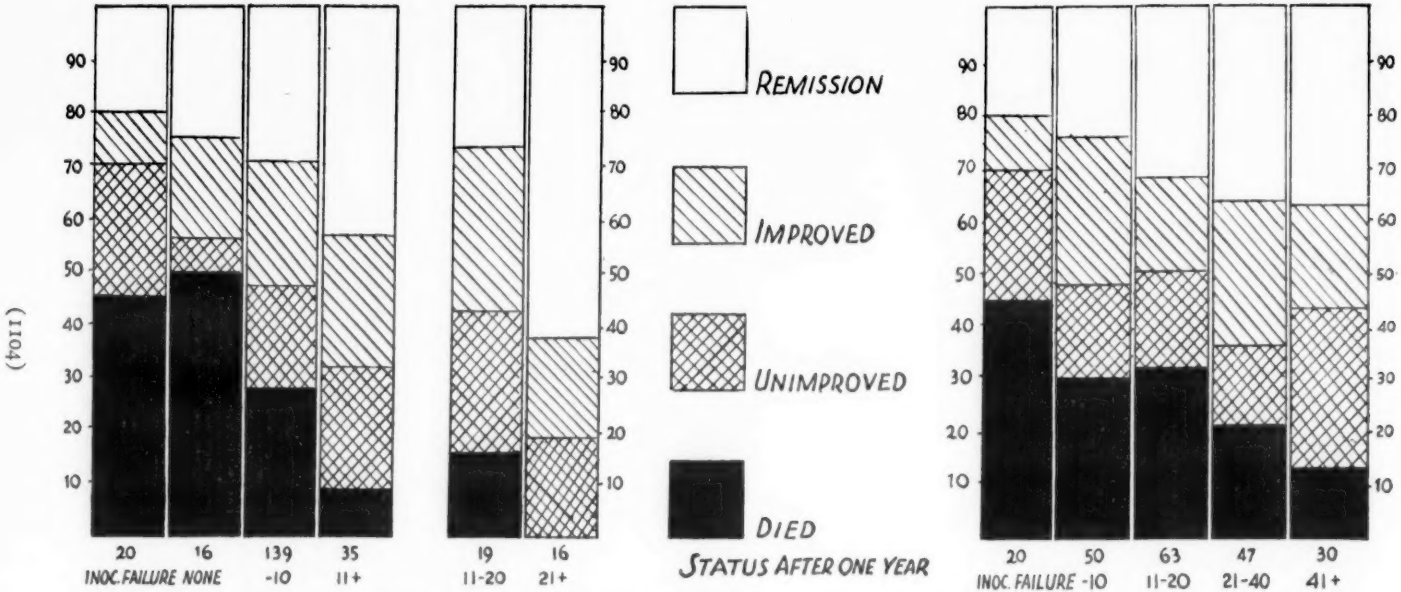
These 2 factors are considered from the standpoint of the age of the patients in Tables 5 and 6.

TABLE 4.

RESULTS FROM MALARIA THERAPY ACCORDING TO THE NUMBER OF PAROXYSMS EXPERIENCED IN WHICH A TEMPERATURE OF 104°F. WAS ATTAINED OR EXCEEDED.

Outcome.	None.		1-10.		11-20.		More than 20.		More than 10.	
	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.
Remission	4	25.0	41	29.5	5	26.3	10	62.5	15	42.9
Improved	3	18.8	32	23.0	6	31.6	3	18.8	9	25.7
Unimproved	1	6.2	28	20.1	5	26.3	3	18.8	8	22.9
Died	8	50.0	38	27.3	3	15.8	0	—	3	8.6
Total	16	100.	139	100.	19	100.	16	100.	35	100.

It would appear (Table 5) that the remission rate among younger patients is higher for the minimal number of paroxysms than among older patients, and tends to be progressively more favorable as the number of paroxysms experienced increases. Considering the results from the standpoint of the number of paroxysms of 104°F. in relation to the age of the patient (Table 6), it would appear that the remission rate in persons below the age of 30 experiencing 10 or fewer paroxysms of 104°F. is more or less the same as that in persons above this age experiencing 11 and more. Relative youth would thus appear to be a factor contributing to favor a remission, although the handicap of advancing years can to a certain extent be offset by an increase in the number of high-temperature paroxysms experienced.



RESULTS IN RELATION TO NUMBER OF PAROXYSMS EXCEEDING 104 DEG. F.

RESULTS IN RELATION TO TOTAL PAROXYSMS

FLORIDA STATE HOSPITAL: STATUS OF 210 NEURO-SYPHILITIC PATIENTS ONE YEAR AFTER INOCULATION WITH MALARIA

TABLE 5.

RESULTS FROM MALARIA THERAPY IN RELATION TO THE AGE OF PATIENT AND THE NUMBER OF PAROXYSMS.

Outcome.	Under 30 years.						30-44 years.						45 years and over.					
	1-10 par.		11-20 par.		21+ par.		1-10 par.		11-20 par.		21+ par.		1-10 par.		11-20 par.		21+ par.	
	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.
Remission	3	42.9	8	53.3	6	54.5	5	16.7	9	23.7	17	36.2	4	33.3	3	27.3	5	26.3
Improved	1	14.3	2	13.3	1	9.1	11	36.7	8	21.	13	27.7	2	16.7	1	9.1	5	26.3
Unimproved	1	14.3	2	13.3	2	18.2	4	13.3	9	23.7	8	17.0	3	25.0	2	18.2	6	31.6
Died	2	28.6	3	20.0	2	18.2	10	33.3	12	31.6	9	19.1	3	25.0	5	45.5	3	15.8
Total	7	100.	15	100.	11	100.	30	100.	38	100.	47	100.	12	100.	11	100.	19	100.

TABLE 6.

RESULTS FROM MALARIA THERAPY IN RELATION TO THE AGE OF THE PATIENT AND THE NUMBER OF PAROXYSMS WITH TEMPERATURE OF 104°F.

Outcome.	Under 30 years.						30-44 years.						45 years and over.					
	None.		10 or fewer.		11 or more.		None.		10 or fewer.		11 or more.		None.		10 or fewer.		11 or more.	
	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.
Remission	3	100.0	13	48.1	1	33.3	0	—	20	25.0	11	44.0	1	33.3	8	25.0	3	42.9
Improved	0	—	4	14.8	0	—	3	30.0	22	27.5	7	28.0	0	—	6	18.8	2	28.6
Unimproved	0	—	3	11.1	2	66.7	1	10.0	16	20.0	4	16.0	0	—	9	28.1	2	28.6
Died	0	—	7	25.9	0	—	6	60.0	22	27.5	3	12.0	2	66.7	9	28.1	0	—
Total	3	100.	27	100.	3	100.	10	100.	80	100.	25	100.	3	100.	32	100.	7	100.

The effectiveness of the different species of parasites employed in the production of paroxysms, particularly paroxysms attaining temperatures of 104°F. or higher, is shown in Table 7.

From this it is seen that but a small proportion of the patients inoculated with *P. falciparum* experienced more than 21 paroxysms, while nearly three-fourths of the quartan cases did. Again, it is seen that none of the *falciparum* cases had more than 10 paroxysms with 104°F., while over one-fourth of the cases inoculated with *quartan* experienced 21 or more. If the benefits from malaria therapy are directly or indirectly attributable to a minimal number of severe paroxysms, the quartan infection appears to be the most dependable agent for their production.

Although the induced malaria attacks were generally permitted to evolve until they terminated spontaneously, it sometimes became necessary, in the interest of the patient, to interrupt the attack by the administration of small doses of quinine. Where interruption was practiced relatively early in the malaria attack, the malaria activity might be resumed after a short interval of quiescence. When practiced late, after the attack had progressed for some weeks, interruption usually meant termination The experience from the standpoint of interference with the malaria attack is shown in Table 8.

From the mortality standpoint, intervention does not appear to have been of any consequence, although the attacks which experienced early intervention, even though later resumed, apparently failed to produce the necessary degree of improvement to effect remission.

The results according to race of patient are presented in Table 9.

The mortality experience in the 2 races is similar. The remission rate among colored persons was actually better than shown, as the furloughing of many colored patients who showed satisfactory improvement was impracticable for lack of guardians.

The time of death in relation to malaria therapy in the 49 deceased patients is shown in Table 10.

Of the 49 patients deceased, it would not appear reasonable to assume that the malaria therapy had contributed to this outcome when death occurred more than one month after the discharge of the patient from the service. Conceding that in 13 instances

TABLE 7.

EFFICIENCY OF THE DIFFERENT SPECIES OF PARASITES IN PRODUCING ATTACKS, MEASURED BY (A) NUMBER OF PAROXYSMS, AND (B) NUMBER OF PAROXYSMS WITH TEMPERATURE OF 104°F. OR HIGHER.

No. of paroxysms.	*a*. Persons experiencing paroxysms (all temperatures).									*b*. Persons experiencing paroxysms of 104°F. or higher.								
	P. vivax.		P. malariæ.		P. falcip.		P. vivax P. falcip.		Total.	P. vivax.		P. malariæ.		P. falcip.		P. vivax P. falcip.		Total.
	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	No.	P. c.	No.	P .c.	No.	P. c.	No.	P. c.	No.
None	0	—	0	—	0	—	0	—	0	10	8.1	3	16.7	3	6.8	0	—	16
1-10	28	22.6	3	16.7	19	43.2	0	—	50	88	71.0	6	33.3	41	93.2	4	100.0	139
11-20	42	33.9	2	11.1	19	43.2	0	—	63	15	12.1	4	22.2	0	—	0	—	19
21 or more	54	43.5	13	72.2	6	13.6	4	100.0	77	11	8.9	5	27.8	0	—	0	—	16
Total	124	100.	18	100.	44	100.	4	100.	190	124	100.	18	100.	44	100.	4	100.	190

TABLE 8.

RESULTS FROM MALARIA THERAPY IN RELATION TO THE TERMINATION OF THE MALARIA ATTACK.

Outcome.	Termination spontaneous.		Early interruption but attack resumed.		Late interruption resulting in termination.	
	No.	P. c.	No.	P. c.	No.	P. c.
Remission	35	31.2	5	18.5	20	39.2
Improved	24	21.4	10	37.0	10	19.6
Unimproved	24	21.4	6	22.2	7	13.7
Died	29	25.9	6	22.2	14	27.5
Total	112	100.	27	100.	51	100.

TABLE 9.

PRESENTING THE RESULTS OF MALARIA THERAPY ACCORDING TO RACE OF PATIENT.

Outcome.	White.		Colored.		Total.	
	No.	P. c.	No.	P. c.	No.	P. c.
Remission	47	33.8	13	25.5	60	31.6
Improved	28	20.1	16	31.4	44	23.2
Unimproved	29	20.9	8	15.7	37	19.5
Died	35	25.2	14	27.5	49	25.8
Total	139	100.	51	100.	190	100.

TABLE 10.

INTERVAL BETWEEN THE TERMINATION OF THE ATTACK OF INDUCED MALARIA AND DEATH OF ALL PATIENTS REPORTED AS DECEASED.

Time of death.	White.	Colored.	Total.	Per cent.
Deaths occurring while on malaria therapy service	6	3	9	18.4
Died less than 1 month later	3	1	4	8.2
1-3 months later	4	0	4	8.2
4-6 months later	2	1	3	6.1
7-12 months later	6	0	6	12.2
More than 1 year later	14	9	23	46.9
Total	35	14	49	100.

the treatment may have been a factor in producing this termination, the therapy *per se* may be debited with a mortality rate of 6.9 per cent.

It should be mentioned that on admission all patients presented a positive Wassermann reaction in the spinal fluid. The therapeutic results secured from symptomatic or asymptomatic patients are shown in Table 11.

From this it is seen that the per cent of remissions is higher, and the proportion dying is lower, among the asymptomatic patients.

TABLE 11.

RESULTS FROM MALARIA THERAPY IN RELATION TO THE CONDITION OF THE PATIENT ON ADMISSION.

Outcome.	Symptomatic.						Asymptomatic.					
	White.		Colored.		Total.		White.		Colored.		Total.	
	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.
Remission	37	30.8	11	23.9	48	28.9	10	52.6	2	40.0	12	50.0
Improved	23	19.2	15	32.6	38	22.9	5	26.3	1	20.0	6	25.0
Unimproved	26	21.7	8	17.4	34	20.5	3	15.8	0	—	3	12.5
Died	34	28.3	12	26.1	46	27.7	1	5.3	2	40.0	3	12.5
Total	120	100.	46	100.	166	100.	19	100.	5	100.	24	100.

The results in different types of the symptomatic cases are presented in Table 12.

The highest proportion of remissions is noted among the patients presenting organic symptoms alone. Of those presenting mental changes, the agitated group, have, judged from remissions or mortality, presented the best results. Numbers of the grandiose or demented patients appear to have benefited, as the remission rate is higher, and the death rate lower among these than among the patients whose inoculation failed (Table 3). The depressed patients, judging from the proportion of remissions, do not appear to have benefited from the therapy, although their mortality has been low.

Follow-up examinations of the Wassermann reaction in the spinal fluid were made in 79 cases. The results of these examinations are shown in Table 13.

The mortality among those whose spinal fluid remained positive was much higher than among those in whom it became negative,

TABLE 12.

RESULTS FROM MALARIA THERAPY IN PATIENTS SUFFERING FROM DIFFERENT TYPES OF SYMPTOMATIC NEUROSYPHILIS.

Outcome.	Organic symptoms only.		With mental involvement.							
			Grandiose Paranoid.		Demented.		Depressed.		Agitated.	
	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.	No.	P. c.
Remission	9	42.9	17	26.6	15	28.8	1	14.3	7	31.8
Improved	7	33.3	14	21.9	8	15.4	2	28.6	7	31.8
Unimproved	1	4.8	10	15.6	14	26.9	3	42.9	5	22.7
Died	4	19.0	23	35.9	15	28.8	1	14.3	3	13.6
Total	21	100.	64	100.	52	100.	7	100.	22	100.

TABLE 13.

CONDITION OF THE SPINAL FLUID AFTER MALARIA THERAPY IN RELATION TO THE RESULTS FROM THE TREATMENT.

Outcome.	No subsequent examinations.		Subsequent examinations.			
			Positive.		Negative.	
	No.	P. c.	No.	P. c.	No.	P. c.
Remission	51	45.9	2	4.3	7	21.2
Improved	11	9.9	18	39.1	15	45.5
Unimproved	11	9.9	16	34.8	10	30.3
Died	38	34.2	10	21.7	1	3.0
Total	111	100.	46	100.	33	100.

indicating the luetic infection probably had been a factor in the production of the fatal termination. The data further indicate that the spinal serology became negative in a significant proportion of the cases which experienced remissions.

Altogether a total of 60 patients who received malaria therapy have been furloughed or discharged in the course of the last 6

years. In order to ascertain their present status, a simple questionnaire was addressed to the guardians into whose custody the patients were furloughed. The status of these patients as revealed by the replies is summarized in Table 14.

Thus of these 60 neurosyphilitic patients furloughed after receiving malaria therapy, reports have been received giving the present status of 36, or 60 per cent, including patients furloughed in each year since the service has been in operation. The data

TABLE 14.

PRESENT STATUS OF PATIENTS FURLOUGHED.

	Interval since furlough.				
	1-2 yrs.	2-3 yrs.	3-4 yrs.	4-5 yrs.	5-6 yrs.
Reporting (36)	4	11	9	7	5
Whereabouts unknown (24)	5	0	7	8	4
Total (60)	9	11	16	15	9
At work	4	9	8	4	4
Unemployed	—	2	1	3	1
Total (36)	4	11	9	7	5

indicate that all except 7 are working. Present employment lies along the following lines:

Occupation.	No.
Housewife	9
Laborer	9
Mechanical trade	4
Clerical work, or merchandizing	6
Miscellaneous	1

No information is available to explain the unemployment of 7 ex-patients.

It thus appears that the remissions induced are well maintained and that most furloughed patients are apparently self supporting.

SUMMARY.

The late results from the employment of malaria therapy supplemented by chemotherapy are presented for a series of 190 cases of cerebro-spinal lues, and compared with the condition of 20 concurrent cases, treated by chemotherapy alone.

The present status of the patients in the 2 series is as follows:

	Malaria therapy plus chemotherapy, per cent.	Chemotherapy alone, per cent.
Remission	31.6	20
Improved	23.2	10
Unimproved	19.5	25
Dead	25.8	45

Thus 55 per cent of the cases receiving malaria therapy as contrasted with 30 per cent of those receiving chemotherapy alone, show varying degrees of improvement to complete remission, while 45 per cent of the former and 70 per cent of the latter are either unimproved or have since died.

The results from naturally or artificially induced malaria attacks do not appear to be significantly different. The quartan parasite appears to be the most effective agent for producing the requisite number of severe paroxysms.

Best results were secured from the application of malaria therapy to persons under the age of 30. Such patients react favorably to fewer paroxysms than appear necessary to produce comparable results in older persons.

Better results from the standpoint of the remission rate as well as of lower mortality are observed as the number of malaria paroxysms increases, although after 40 paroxysms have been experienced the chief improvement appears to be in the subsequent mortality rate. More striking, however, are the results when considered from the standpoint of the number of severe paroxysms experienced, arbitrarily placed at 104°F. Persons experiencing 21 or more such paroxysms have had a remission rate in excess of 60 per cent with no mortality. Those having 11 or more have a remission rate of 43 per cent and a mortality of 9 per cent.

It has been assumed that only deaths occurring within one month of the cessation of the attack of induced malaria can fairly be laid to the treatment. Of the 49 reported as deceased only 13 died within that period, which would give a mortality rate of 6.9 per cent.

Better results have been secured from asymptomatic cases than from symptomatic. Of the latter, the cases presenting organic signs only have given better results than those with mental involve-

ment. In the group with mental involvement best results have been secured with the agitated, and poorest results with the depressed cases.

Conclusions.

Malaria therapy combined with chemotherapy gives very much better results in the treatment of neurosyphilis than chemotherapy alone.

Individuals below the age of 30 years respond to this treatment much better than do older persons.

The severity of the paroxysms experienced, rather than their number, appears to have a definite influence on the results secured.

It is suggested that the objective of malaria therapy should be the subjection of the patient to a minimum of 21 paroxysms which attain a height of 104°F. or more, and that, if the first strain or species of parasite employed fails to produce this minimum, reinoculation with different strains or species should be undertaken until this minimum is reached. The single infection with the quartan parasite appears most frequently to produce this result.

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HEREDITARY FORM OF PRIMARY PARENCHYMATOUS ATROPHY OF THE CEREBELLAR CORTEX ASSOCIATED WITH MENTAL DETERIORATION.*

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A tremendous literature has accumulated on the cerebellar ataxias. Numerous classifications have been made which have often resulted in greater confusion. In 1922, Marie, Foix and Alajounine [1] suggested a grouping of the degenerative cerebellar ataxias which appears most satisfactory to date. They differentiated three large groups: the congenital, the acquired and the heredofamilial groups. The congenital group are characterized by the predominant involvement of the phylogenetically younger parts of the cerbellum. (Scherer,[2] Koster,[3] Vogt and Astwazaturow [4] and others). The acquired group was divided into several types, two of which are at present considered to be fairly distinctive. These are the olivo-ponto-cerebellar atrophies, first described by Dejerine and Thomas [5] and the primary parenchymatous atrophies of the cerebellar cortex originally described by Thomas [6] and recently reviewed by Parker and Kernohan.[7]

The heredo-familial group is at present in almost hopeless confusion, due in large part to the lack of adequate pathological studies. This confusion may be said to have followed the publication of Marie [8] in which he tried to isolate an entity distinct from Friedreichs' disease. On the basis of 16 clinical cases with pathological studies of two, he formulated a new disorder consisting essentially of a cerebellar involvement with relatively intact spinal cord. This he called hereditary cerebellar ataxia. As Holmes [9] has shown beyond further dispute, there was no justification to include these cases together on the basis of etiological, clinical or pathological grounds. Nevertheless, many neurologists continue

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to hold on to this concept of Marie's hereditary cerebellar ataxia, giving it a different interpretation however, for example, Marie and Foix,[10] Marinesco and Trêtiakoff [11] and Foix and Trêtiakoff [12] consider the hereditary cerebellar ataxias to be those degenerative conditions of the central nervous system in which the tracts in the ventral portions of the spinal cord are predominantly involved in contrast to Friedreichs' ataxia in which the degeneration occurs in the dorsal portions of the spinal cord. Those cases showing involvement of both " systems " are spoken of as mixed or transitional forms.

Raymond [13] suggested a unitary concept of the ataxias stating that all the familial and hereditary nervous affections formed a continuous chain and that Friedreichs' and Marie's ataxias belonged to the same morbid group. In both diseases and their transitions the cerebellar system which included the cerebellum and its afferent and efferent pathways was involved. Mollaret [14] believed that Friedreichs' ataxia, Marie's ataxia and the familial spastic paraplegias should be grouped together as belonging to essentially the same pathological process, differing only in the anatomical distribution of the lesions. This attitude has become increasingly prevalent among neurologists because occasional cases occur where first, differences in the clinical picture present themselves in various members of one family; second, clinical pictures which seem to represent intermediate or transitional forms; and third, one aspect, then another aspect occurs in the same individual. This tendency to move away completely from the concept of biologically unified hereditary types of nervous disorders reaches its climax in the doctrine of heredodegeneration of Jendrassik.[15] According to him, there is a kind of generalized heredodegenerative tendency of the nervous system which manifests itself now as one clinical picture and now as another. This doctrine appears to many investigators to be biologically inadequate since unified hereditary types of nervous disease do occur of which Huntington's chorea is a good example. It is possible that an aggregation of distinct troubles in one family may arise for two reasons: first, from inbreeding and secondly, from social and sexual selection, since persons with various kinds of hereditary defects are not likely to be chosen as mates by normal human beings, and therefore have to content themselves with one another.

This attitude of hopelessness of any possible classification of the hereditary forms of ataxias stimulated a review of the literature in the hope that certain well-defined types analogous to the acquired olivo-ponto-cerebellar atrophies and the acquired primary parenchymatous cortical cerebellar atrophies may be found in a hereditary form. Keiller [16] has reported in a negro family four cases with pathological study of three in which a hereditary form of olivo-pontocerebellar atrophy was present. Recently a further pathological study of one of these cases has been reported by Hassin and Harris.[17] According to the latter, the great majority of the cases reported as Marie's hereditary cerebellar ataxia have been cases of olivo-ponto-cerebellar atrophy. Similarly, the family of Neff,[18] of which case ten was studied pathologically,[19] probably belongs to this type of atrophy.

Holmes [20] and Thorpe [21] have described a familial form of cerebellar ataxia in which the pathological changes were similar to those found in the acquired form of primary parenchymatous atrophy of the cerebellar cortex. However, as far as I can find, no hereditary form has been reported. The present study concerns a family traced through three generations in which a hereditary disorder of the central nervous system was found. Clinically it was characterized by cerebellar ataxia and mental deterioration of varying degree. Pathological study of two brothers of the third generation revealed an atrophy of the frontal and parietal lobes and an essentially selective destruction of Purkinje cells with preservation of the basket fibers, most marked in the superior vermis of the cerebellum.

CASE REPORTS.

Family History.—The maternal grandfather, in his forties, became awkward in his gait and later developed a mental disturbance. He was committed to a mental institution where he died less than two years after the onset of the disorder. He was not related to the wife (no consanguinity).

The mother was the only child. At the age of 39 years she developed an ataxia, beginning in her legs and later involving the arms. She was sick for about one year and toward the end, she became violent, confused, and developed bizarre delusions and hallucinations.

The father died at the age of 84. He did not exhibit any ataxia or mental deterioration. From this union four children were born. He was not related to his wife.

L—, the oldest sib, was considered a neurotic type of individual most of her life. At the age of 49 years she developed difficulty in walking and clumsiness in the use of her hands. She showed increasing difficulty in memory, became confused and untidy in personal habits. Finally she passed into a comatose state and died. The duration of her illness was less than a year.

Wi— is Case 2 of the present study.

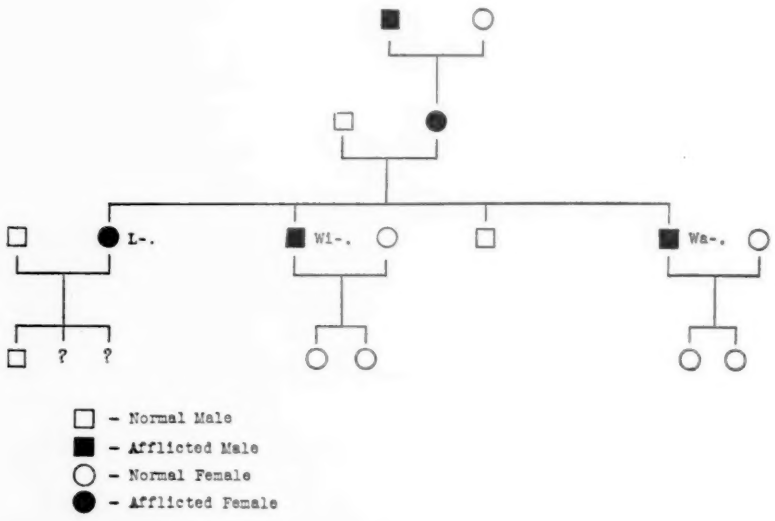
G—, aged 46 years, is living and well.

Wa— is Case 1 of the present study.

The children of L—, Wi—, and Wa—, comprising the fourth generation, are in good health and no symptoms of a neurological or psychiatric nature have been noted.

It is interesting to note that the mother, L—, and Wi— were extremely sensitive to morphine and its derivatives.

The family history is briefly summarized in the following graph:



CASE 1.—On October 2, 1931, Wa—, a farmer aged 42, entered the Strong Memorial Hospital complaining of inability to walk or stand.

Personal History.—The patient had always enjoyed fair health until the present illness. In childhood he had had measles and chicken pox without complications. He did not use tobacco, drugs or alcohol.

Present Illness.—In January, 1930, the patient noticed slight difficulty in speaking and swallowing. In July, 1930, he fell off a roof, did not lose consciousness and sustained no injury. Following this accident he felt weak and this symptom had continued up to the time of admission. In November he suffered from headache, blurring of vision and diplopia. After glasses

were prescribed, there was an improvement of vision and relief of headache but the diplopia continued. The first evidence of difficulty in gait, due to an inability to keep his balance, appeared in March, 1931. This difficulty increased so that in July he was unable to walk without support.

On July 23 he was seen by Dr. J. L. Eckel of Buffalo who was impressed by the predominance of signs of cerebellar disorder. The gait was markedly ataxic; the patient walked with a broad base, lunging and lurching forward. He showed no ataxia in the finger to nose test, and when lying down there was no ataxia in the heel to knee tests. Examination of the cranial nerves was essentially negative except for occasional diplopia in which the objects appeared parallel. When lying down the musculature of the lower extremities was definitely hypotonic. No sensory changes were found.

In September he developed incoordination of his right arm which was not noticeable in attempts at writing or eating. At this time his wife noted that he would occasionally become confused. Two weeks before admission articulation became very difficult.

Physical Status.—The patient was a well developed, somewhat undernourished man who appeared chronically ill. The temperature was 37° C., the pulse 82, the respirations 18, the systolic blood pressure 110 mm. Hg. and the diastolic 80 mm. Hg. The physical examination was not remarkable except for the neurological findings.

The neurological examination disclosed marked evidence of cerebellar disorder. Examination of the cranial nerves revealed a slight weakness of the lower facial group of muscles bilaterally, although the patient could whistle easily. There was some difficulty in swallowing but no regurgitation of fluids through the nose was noted. Articulation was slow, hesitant, slightly indistinct and difficult. No nystagmus noted. Handwriting was executed very slowly, with much deliberation and showed marked tremor. The patient could not stand without swaying to the left and backwards either with his eyes opened or closed. With assistance, he walked on a broad base, his body pitching backwards and to the left with a marked dissociation between the movements of the legs and body. After walking a short distance, a fibrillary tremor in the calf muscles was observed. The patient showed marked bilateral incoordination and dysmetria (most marked on the right side) especially toward the end of purposeful movements. This was well seen in the finger to nose, finger to finger, and heel along shin tests. Finer movements were very much disturbed and adiadokokinesis was present bilaterally. The rebound phenomena of Stewart and Holmes was present bilaterally. The patient was right-handed, the hand grip was weaker on the right side. The muscles were firm but definite hypotonia was found to passive movement. The tendon reflexes were hyperactive and equal and an abortive ankle clonus was present bilaterally. The abdominal and cremasteric reflexes were active and equal. The plantar reflex was normal bilaterally. Sensation was normal.

Mental Status.—No formal mental status was made. About one month before admission, the wife noticed occasional periods of confusion and a certain decline in his personal habits. During the neurological examination he showed difficulty in understanding moderately complex requests. He was

depressed and preoccupied but no distortions of content were noted. He was oriented in all spheres, but memory for recent events was impaired. He also complained of occasional periods of confusion, none of which were striking enough during his stay in the hospital to warrant comment.

Laboratory Studies.—The blood and urine examinations were not abnormal. The Wassermann and Kahn reactions of the blood and spinal fluid were negative. A lumbar puncture revealed an initial pressure of 105 mm. water. There were eight lymphocytes per c. mm. and no increase in globulin. No reduction in Lange's colloidal gold test was found. The chemistry of the spinal fluid on two occasions revealed nonprotein nitrogen 16 and 18 mgm per 100 c.c., sugar 60 and 85 mgm per 100 c.c. and chlorides 640 and 700 mgm per 100 c.c.

Course.—The heredo-familial nature of the disease was not admitted by the patient or his wife until after the operation. After much deliberation it was decided to do an encephalogram. Roentgenological pictures did not show any air in the ventricles. Three days later, November 2, an exploratory craniotomy was performed under local and avertin anæsthesia. At operation, the cerebellum and the arachnoid over the posterior cisternal fossa was normal in appearance.

The post-operative course was progressively downhill, the temperature gradually rose and reached 41.8° C. just before death, November 6, 1931.

Clinical Diagnosis.—Degenerative condition of the cerebellum.

Pathological Anatomy.—The autopsy was performed by Dr. G. M. Meade one hour after death. The lungs showed atelectasis, edema and some hyperemia. The sinusoids of the liver were diffusely infiltrated with numerous polymorphonuclear cells and occasional round cells. Similarly, the spleen weighing 90 grams showed a diffuse increase in the polymorphonuclear cells in the pulp tissue. These findings suggested the possibility of a septicemic process. The thyroid showed adenomatous changes. Over the left patellar region was found a hemangioma of the skin. In the liver a small adrenal rest was discovered.

Macroscopic Examination of Central Nervous System.—The calvarium was markedly thin in the left parietal region. The brain weight 1380 grams. It was of normal consistency, the dura and leptomeninges were normal in appearance, and the larger blood vessels were neither thickened nor sclerotic. No gross atrophy of the cortex of the cerebrum or cerebellum was observed. After fixation in 10 per cent formalin, the brain was sectioned. The ventricles were not dilated and there was no atrophy of the internal gray matter. The spinal cord was of normal size and form and showed no gross changes.

Microscopic Examination of Central Nervous System.—Frontal lobe: The leptomeninges were not thickened. Many large round cells containing a pigment staining green in thionin and yellow in hæmatoxylin-eosin sections were found in the meshes of the leptomeninges. These were macrophages containing phagocytized products of degeneration, probably lipochromes. Few amyloid bodies were found and these were usually found in the moleuclar layer in the sulci. The blood vessels showed slight thickening of their walls. The perivascular spaces were widened and contained large amounts of lipo-

chrome pigment, some lying free but most of its phagocytized by macrophages similar to those found in the leptomeninges. The neuroglia showed a mild hypertrophy diffusely throughout the cortex and white matter. Occasionally minute nodules of swollen glia and microglia were found around small blood-vessels.

The cortex showed a diffuse diminution of cells most evident in the third and fifth layers (Fig. 1). Many of the remaining large pyramidal cells in the third layer showed evidence of chronic pathological changes such as sclerosis. The glia about these cells showed regressive changes. With Bielschowsky stains the neurofibrillæ were thickened but no changes were found as occurs in Alzheimer's disease.

The changes in the parietal cortex were similar but less intensive than in the frontal lobe.

Corpus striatum: In the globus pallidus, putamen and caudate nucleus the nerve cells were well preserved and abundant.

Thalamus and diencephalon: In thionin stains nothing remarkable was noted.

Mesencephalon: In thionin stains the cells of the substantia nigra, red nucleus, oculomotor and trochlear nuclei and the tegmental gray matter were abundant and well-prserved. In Spielmeyer myelin stains, the tegmental decussations, the medial and lateral lemnisci, the thalamo-olivary tracts, the basi pedunculi and brachia conjunctiva showed no evidence of degeneration.

Pons and medulla oblongata: As described later, this region with the cerbellum was cut serially. The nuclei of the pons, the nuclei of the various cranial nerves, the arcuate nuclei, and the superior olivary nuclei contained abundant numbers of well preserved nerve cells. In the medial portion of the dorsal layer of the inferior olives the cells were diminished in number and many of the remaining cells were sclerotic. Similar changes were found in the dorsal and medial accessory olives. There was a moderate hypertrophy and hyperplasia of the neuroglia in this region. In Spielmeyer stains the fibrae arcuate interna (olivo-cerebellar fibers) were slightly diminished in number. No loss of fibers were noted in other tracts including the fibrae pontis, the posterior longitudinal fasciculi, the medial and lateral lemnisci, the arcuate fibers, the brachium pontis, and the restiform body. The walls of the bloodvessels were slightly thickened.

Cerebellum: Except for a few blocks removed for frozen sections and special mordanting, the cerebellum with pons and medulla oblongata was cut in a horizontal series at 40μ and every ninth, tenth and eleventh section stained with hæmatoxylin and eosin, thionin and Spielmeyer myelin stain, respectively. In the study of the distribution of the changes in the cortex of the cerebellum, the nomenclature of Ziehen [22] was employed.

The leptomeninges over the superior vermis were thickened and contained moderate numbers of macrophages identical to those described in the frontal lobe. The blood vessels were not remarkable.

In the superior vermis composed of the lingula, lobulus centralis, culmen and declive, the Purkinje cells were very much diminished in number (Fig. 2). Most of the remaining Purkinje cells showed the process of shrinkage.

In these the nucleus was hyperchromatic and frequently distorted in form, the cell body was deeply stained and devoid of Nissl bodies. Around these disintegrating cells the typical shrubbery formation of proliferated neuroglial and microglial cells were frequently found. In those regions where the Purkinje cells were completely absent, the layer of Bergman's astrocytes were proliferated (Fig. 3). In Bielschowsky stains the basket fibers around the disintegrated Purkinje cells were usually well preserved (Fig. 4). These changes suggested the centrifugal or descending type of cerebellar atrophy. The molecular and granular layers were of normal thickness and contained nerve cells of normal abundance. In the white matter a moderate hypertrophy and hyperplasia of fibrous neuroglia was found (Fig. 5). In Scharlach R preparations occasional scavenger cells filled with fat were found in small numbers diffusely scattered throughout the white matter and the granular layer. In myelin stains, such as the Pal Weigert and Spielmeyer methods, no areas of demyelinization were observed.

In the hemispheres, the vincula lingulæ, the alæ lobuli centralis, the lobuli quadrangularis anterior and posterior, and lobuli semilunaris superior showed discrete areas of absent and diseased Purkinje cells. This loss was most evident in the vincula lingulæ, the ala lobuli centralis and lobuli quadrangularis anterior. In the lobuli posterior and to a greater extent in the lobuli semilunaris superior, the Purkinje cells were most abundant and in general less damaged. In the lobuli semilunaris inferior, the lobuli biventer, the tonsillæ and the flocculi, the Purkinje cells were well preserved and of normal abundance. In the tuber vermis, pyramis and uvula the Purkinje cells were well preserved and of normal abundance. Bielschowsky stains revealed normal Purkinje cells (Fig. 6).

The mesial group of intracerebellar nuclei (nuclei fastigii and globosi) and the nuclei emboliformi were well preserved. The nuclei dentati contained abundant and well preserved cells except for the antero-medial portion of the left dentate nucleus where a few cells appeared shrunken and pyknotic.

Thoracic cord: In thionin sections, the nerve cells in the anterior, lateral and posterior columns were abundant and well preserved. The cells of the nucleus dorsalis (Clarke's column) were normal in appearance but slightly diminished in number in a few segments. From segments 8 to 12 the central canal was moderately dilated. With neuroglial stains no hypertrophy or hyperplasia of neuroglia was found. In Marchi stains no degeneration was noted and in Pal Weigert stains the tracts appeared well preserved (Fig. 7).

CASE 2.—On January 9, 1931, an insurance man, aged 51, was committed to the Rochester State Hospital in an excited and confused state.

Personal History.—The patient had developed normally and had enjoyed good health until the present illness. He had always been a very optimistic, cheerful, outgoing type of individual, an indefatigable worker and a prominent leader in civic, educational, religious and athletic affairs. He was temperate in the use of alcohol and tobacco and was not addicted to any habit-forming drug.

Present Illness.—In January, 1930, the patient became restless, somewhat depressed and complained of insomnia. In March, his team mates noticed that he was awkward in his actions on the volley-ball court. This was striking in view of the fact that he had formerly been an excellent athlete. In June he began to complain of weakness and developed difficulty in phonation. He stated that his throat filled up when he spoke and he occasionally experienced difficulty in swallowing. A laryngoscopic examination revealed no pathology. In August he began to show an ataxic gait and would often become confused at night. At this time he would be disoriented, delusional and hallucinated. He was admitted to several general hospitals where thorough studies revealed nothing to explain the patient's symptoms. Thorough laboratory studies, including two lumbar punctures, were completely negative. There was an increase of mental symptoms which were typically those of a delirium occurring in toxic states or organic diseases of the brain. In November the patient became very ataxic and the dysarthria became so marked that his talk was incomprehensible. Just before admission to the Rochester State Hospital he became so excited that he could no longer be managed at home.

Physical Status.—This was performed by Dr. W. English. The patient was a poorly developed and poorly nourished man who appeared dehydrated and chronically ill. He was restless and confused. The temperature was 38° C., the pulse was 104, the respirations 20, the systolic blood pressure was 102 mm. Hg. and diastolic 70 mm. Hg. The teeth were carious and the throat contained a large amount of purulent discharge. The chest was resonant, expansion was diminished and râles were heard over the apices and in the interscapular region. The heart was enlarged to the left.

The neurological examination disclosed weakness and unsteadiness to be the most striking signs. Vision was good; the pupils were regular, equal and reacted to light and upon accommodation. Hearing was normal and there was no nystagmus. Articulation was disturbed and the speech was very indistinct. A coarse tremor of the tongue and hands was present. Romberg test could not be performed because of inability of patient to stand alone even with eyes open. Various coordination tests, such as finger to nose, finger to finger, and heel along shin could not be performed. Walking was very ataxic and could only be done with assistance. The patient was right-handed, the hand grips were weak but not unequal. To passive movement, hypotonia was evident in the extremities. The deep reflexes were increased but equal; the abdominals were active and equal. The plantar reflex was normal bilaterally. Sensation was normal and no vasomotor nor trophic changes were present. The patient was incontinent of urine and fæces.

Mental Status.—Upon admission the patient was untidy, excited and confused so that he had to be restrained. Talk was an incomprehensible mumble and often he would break out into spells of crying. The mood was one of bewilderment. He was hallucinating but it was impossible to obtain the content of his hallucinations. The sensorium, mental capacity and grasp showed marked impairment. In brief, he presented a picture of marked deterioration as seen in the delirious dysergastic or anergastic reaction of types.

Laboratory Studies.—The blood and urine studies were not remarkable. The Wassermann and Kahn reactions of the blood and spinal fluid were negative. The examination of the spinal fluid showed no cells, no increase of globulin and no reduction of the colloidal gold curve.

Course.—In view of the fact that patient was in an apparently toxic delirious state he was placed on a forced fluid régime. In a few days, he cleared sufficiently so that he was fairly cooperative for a physical examination. Following a throat examination on January 12, he developed an attack of myocardial failure from which he recovered. This improvement lasted only a short time and on January 18, he became very much confused, was unable to recognize friends or relatives, became extremely restless and began to go into periodic states of stupor. Stimulants were of little avail and on January 23 he developed another attack of myocardial failure. He became cyanotic and dyspneic and oxygen inhalations were employed. He died January 24, 1931. During the last four days of life the temperature varied from 38.5 to 39.8° C., the pulse 110 to 120, and the respirations 28 to 32.

Clinical Diagnosis: Hypostatic pneumonia and toxic psychosis.

Pathological Anatomy.—The autopsy was performed by Dr. R. King 13 hours after death. Examination of the internal organs revealed sclerosis of the coronary arteries, acute dilatation of the right side of the heart and hypostatic pneumonia.

Macroscopic Examination of Central Nervous System.—The calvarium was thin and the outer table was completely lacking in the posterior parietal regions bilaterally. The dura was firmly adherent to the skull. The leptomeninges were very edematous with discrete areas of thickening which were adherent to the convolutions. There was a great excess of cerebrospinal fluid in the subarachnoid space.

The brain was rather flabby and edematous and weighed 1260 grams. The convolutions in the frontal and parietal regions were markedly atrophic. In the region of the parietooccipital fissure on both convexities two symmetrical depressions were seen. The cerebellum was normal in size and form and no atrophy of the folia was noted. The pons and olives were normal in size and form. The arteries at the base of the brain were slightly sclerotic. The brain was fixed in ten per cent formalin and cut horizontally. There was a slight dilatation of the lateral ventricles. The striatum and thalamus were not disproportionately reduced in size. In a section through the cerebral peduncles, a small old infarct measuring one millimeter in diameter was found to the left of the aqueduct of Sylvius. Only the first cervical segment of the spinal cord was obtained for study.

Microscopic Examination of the Central Nervous System.—Cerebral cortex: Over the frontal and parietal lobes the leptomeninges were slightly thickened and edematous. A moderate number of macrophages containing a green pigment (with thionin stains) were found in the subarachnoid spaces. The walls of the larger arteries were slightly thickened. In the white matter the perivascular spaces were moderately dilated and contained masses of green pigment lying free or within cells. The neuroglia showed hyperplasia

but little hypertrophy. An occasional perivascular glial nodule was found. True neuronophagia by glia was found about many of the nerve cells in the third and fifth layers.

The striking feature in the cortex of the frontal and parietal lobes was the diffuse loss of cells, most marked in the third and fifth layers. In the third layer many of the remaining cells showed pyknosis of the cytoplasm and nucleus and in general presented the picture of chronic disease. Sections from the other parts of the cortex showed minor changes in the nerve cells especially in the third layer.

Corpus striatum: In the globus pallidus, the large and small cells appeared normal and were present in abundance. The large cells of the putamen contained large amounts of lipochrome pigment. The cells of the caudate nucleus did not show any pathological change. In the thalamus, diencephalon, substantia nigra and red nucleus the cells did not appear abnormal or diminished in number.

Mesencephalon: In the tegmentum on the left side, a small old anemic infarct was found superior and lateral to the nucleus of Darkschewitch. Around this area numerous colloid bodies were found. In Spielmeyer stains loss of fibres of the inferior brachium colliculi was found on the left side. In the pes peduncularis no degenerations were found in the temporo-pontine, fronto-pontine and pyramidal tracts.

Pons: No degeneration was noted in Pal Weigert stains. (Fig. 8). In thionin stains the nerve cells were well preserved and of normal abundance.

Medulla oblongata: The hiluses of both olives were poor in myelinated fibers suggesting degeneration of these olivary fibers, most evident in the left olivary body. The peri-olivary fibers were definitely diminished and very few myelin fibers were found between the convolutions of the olives. The fibræ arcuatæ internæ (olivo-cerebellar fibers) showed a definite loss of fibers most evident on the left side. The restiform body appeared to be well preserved (Fig. 9). The inferior olives showed similar but more extensive changes than in Case 1. The cells in the medial portions of the dorsal and ventral layers and in the dorsal and medial accessory olives were diminished in number and many showed sclerotic changes.

Cerebellum: The nomenclature of Ziehen (22) was used in the study of the distribution of the changes in the cortex of the cerebellum (Fig. 2). Throughout most of the anterior and superior parts of the cerebellum, many of the Purkinje cells showed pathological changes. In these cells the nuclei were distorted and many showed polymorphous forms. In Bergmann's layer, the nuclei of the glial cells were often larger than normal and vesicular in form. These changes were suggestive of an acute process.

The most striking changes, however, were seen in the superior vermis. In the lobuli centralis the Purkinje cells were very much diminished in number and practically all of those remaining showed pathological changes. In the culmen, the Purkinje cells, although diminished in number, were more abundant than in the lobuli centrali but even here occasional areas were found where the Purkinje cells were completely absent. In the lobuli quadrantus

anterior and posterior, there was found only a slight reduction in the number of Purkinje cells (Fig. 10). In the lobulus semilunaris and the inferior vermis the Purkinje cells were of normal abundance.

The granular and molecular layers were normal in thickness and appearance. In Pal Weigert stains no degenerations were found in the white matter and the intracerebellar nuclei were normal in size and form. In thionin stains the cells of the dentate nuclei showed an excessive amount of lipochrome pigments.

Cervical cord: In Pal Weigert stains no degenerations were noted except for bilateral paling of the olivo-spinal tracts (Fig. 11). This was not abnormal as this is normally found and in the present case Bielschowsky stains revealed normal neurofibrils and fat stains did not show any fat.

SUMMARY.

In a family traced through three successive generations five members were afflicted with symptoms of ataxia and mental deterioration of varying degree. The children of three of the sibs of the third generation are in good health. The age of onset was between 40 and 50 years. The course of the disease was rapidly progressive and death occurred within two years of onset.

Case 1.—Gradual onset of a slight difficulty in speaking and swallowing appeared at the age of 40, two years before death. One year later developed diplopia and blurring of vision which subsequently disappeared. Six months before death, onset of difficulty of gait which steadily increased so that three months before death he was unable to walk without assistance. Two months before death incoordination of right arm was noticed. At this time he became somewhat untidy in his personal habits and was subject to occasional periods of confusion. On admission to the Strong Memorial Hospital he presented evidence of marked cerebellar disturbance. Four days after an exploratory craniotomy the patient died.

Pathological examination revealed no gross atrophy of the cerebral cortex but microscopic study showed a diffuse involvement of the nerve cells in third and fifth layers of the frontal cortex and to a less degree of the parietal cortex. In the cerebellum, no gross atrophy was found. Microscopically, an elective destruction of Purkinje cells with preservation of the basket fibers was found. These changes were most marked in the superior vermis and to a less extent in the corresponding portions of the hemispheres,

namely, the vinculum lingulæ, ala lobule centralis and the lobulus quadrangularis. The spinal cord was normal.

Case 2.—Onset of an agitated depression and awkwardness of movements at the age of 50, one year before death. Six months later developed weakness, a difficulty in speech, and some dysphagia. Four months before death onset of mental symptoms, suggestive of organic brain disease, and an ataxic gait. Rapid progression of symptoms during the last two months of life. Following admission to the Rochester State Hospital temporary improvement occurred but patient died of pneumonia.

Pathological examination revealed a gross atrophy of the frontal and parietal lobes. Microscopic study of the cerebral cortex showed similar changes as in Case 1, except that they were more marked. The cerebellum showed no atrophy grossly. Microscopically, the changes were similar to that found in Case 1, except that the process was more acute.

COMMENT.

Hereditary Nature of the Disease.—The disorder in this family can be safely considered to be of a hereditary nature for several reasons. First, the disease has been traced in each of three successive generations. The percentage afflicted in this family is higher than the expected 50 in a simple dominant inheritance. However, the number of cases is so small that it can be assumed that the heredity probably takes a simple dominant form. Second, three members of the third generation show the same type of disease—so-called homologous heredity. Third, the disease appears at approximately the same age in different members of the family—so-called homochronous heredity. Fourth, beginning with the first appearance of the disease there is a steady and rapid progression. Fifth, trauma, intoxication and infection can be ruled out in Case 1. The sensitivity to morphine of Case 2, the mother and L— may have played a variable rôle in accentuating the symptomatology but it is reasonably certain that toxicity was not the primary factor.

Correlation of Clinical and Anatomical Examinations.—In all five members neurological signs were the first to appear. In the grandfather, mother and Case 1, ataxia occurred before the onset of the mental symptoms. Even in Case 2 clumsiness and difficulty

of speech were noted before the onset of confusion, although ataxia only became apparent during the last four months of life. No evidence of chorea was noted by different observers who had examined Case 1 and Case 2. I especially inquired of relatives and intimate friends of the mother and her children regarding the appearance of involuntary movements and none had noticed them.

To a fair degree the clinical signs and symptoms can be easily correlated with the pathological findings. The striking anergastic reaction in Case 2 finds its explanation in the atrophy of the frontal and parietal lobes. In Case 1 where the mental symptoms consisted of a slight regression in behavior and occasional periods of confusion, the pathological changes in the frontal and parietal cortex were much less marked than in Case 2. In both cases the involvement of the frontal and parietal cortex was most marked in the third and fifth layers.

In both cases no gross atrophy of the cerebellum was observed. This is similar to the observations of Thomas,[6] Jelgersma,[23] and Parker and Kernohan [7] in their studies of cases of acquired forms of parenchymatous atrophy of the cerebellar cortex. Microscopic study revealed an elective destruction of Purkinje cells suggesting a centrifugal or descending type of cerebellar atrophy. In Case 1 where ataxia was the outstanding feature, the almost complete loss of Purkinje cells in the superior vermis and to a less degree the diminution in numbers of cells in the adjacent portions of the cerebellar hemispheres was striking. In Case 2, the process in the cerebellum was of a more acute nature and the regional involvement not so evident as in Case 1, although the superior vermis appeared most involved. These findings can be correlated with the clinical picture, for ataxia came on relatively late in the course of the disease and was never so marked as in Case 1.

The rather limited involvement of the cerebellum, especially in Case 1, is interesting from an ontogenetic-phylogenetic and physiological point of view. In spite of a great deal of experimental work, the functions of the cerebellum are not definitely known, (van Rijnberk [24]) and the problem of localization is still a debated question (Miller [25]). The cerebellum develops from a thickening of the rhomboidal lip bordering the lateral recess of the fourth ventricle. The antero-medial wall, adjacent to the midbrain, forms

the anterior lobe in the adult. The latter consists of the lingula, lobulus centralis and culmen of the superior vermis, the vinculum lingulæ, ala lobulus centralis and lobulus quadrangularis anterior of the cerebellar hemispheres. This may be roughly correlated with the pathological changes found in the cases reported here. Similarly, the phylogenetically older parts of the cerebellum are here involved.

A large amount of work has been done regarding the cerebellar terminations of the spino-cerebellar tracts in various animals. A critical analysis of the work of the different investigators may be found in the articles of Bing [26] and Beck.[27] Suffice to say, the majority of investigators have found that the greatest proportion of the fibers of the dorsal and ventral spinocerebellar tracts end in the superior vermis. Therefore, the present study suggests that this portion of the cerebellum serves an important rôle in the regulation of the harmony of the movements of the lower limbs since the ataxia was most prevalent and occurred earliest in the legs. (Case 1.) Lhermitte [28] has reached similar conclusions in his study of the cerebellar signs in some cases of senility.

These conclusions are made with reservation since the cerebellar lesion was not the only part of the central nervous system involved. It is well known that loss of Purkinje cells occurs in senility and this degeneration is most prominent in the anterior portions of the cerebellum (Ellis [29]). However, only a few elderly people show an ataxia of sufficient degree to consult a neurologist. Similarly, marked changes may be found in the cerebellum with no clinical signs as shown by Hassin [30] and others. Jelgersma [31] has developed a theory of cerebellar function in which the Purkinje cell is considered to be the central point in the mechanism of muscular coordination or harmonizing. Through this cell a dual impulse passes —one coming from the periphery by way of the spinocerebellar tracts and the other coming from the cerebral cortex through the cortico-ponto-cerebellar tracts. These two impulses form two so-called " Bewegungsbilder " or forms of movement. If these two impulses harmonize, the Purkinje cells do not act, but if they are defective, the Purkinje cells correct this lack of harmony. In the present cases the spino-cerebellar and cortico-ponto-cerebellar tracts were intact but the Purkinje cells were destroyed. However, the

cortex of the frontal and parietal lobes was involved so that the cerebral "Bewegungsbilder" could have been disturbed even though no histological evidence of degeneration of the cortico-ponto-cerebellar tracts was found. The compensatory action of the cerebral cortex may have been inadequate in an acute process as was present in these cases. In Case 2 toxic factors may easily have accentuated the cerebellar signs for it is a well known fact that drugs and intoxicants depress the cerebral activity and thus dispose of the corrective aspects of the cerebrum.

Difficulty with articulation and swallowing was the chief complaint of both cases at an early stage of the disease. This would naturally suggest an involvement of the nuclei in the posterior portion of the medulla oblongata. However, serial study of this region in Case 1 revealed no evidence of change in the bulbar nuclei. It is possible that a lesion in the lobulus quadrantus anterior may affect the coordination of the muscles of the larynx and pharynx, thus producing the symptomatology as found in both brothers (Mills and Weisenburg [32]). Holmes [33] has found that lesions of the vermis are most apt to cause disorders of speech. Regarding the occurrence of diplopia in Case 1, Holmes [33] has noted transient paresis of ocular muscles in the early stages of cerebellar injury. The absence of nystagmus may be explained by the preservation of the inferior vermis and flocculus which receive vestibular fibres predominantly (Herrick [34]). The vestibular nuclei and vestibulo-cerebellar tracts were intact.

In both cases changes in the inferior olives were present. These consisted of diminution in number of nerve cells, and sclerotic atrophy of many of the remaining nerve cells in the medial portion of the dorsal layer in Case 1 and similar but more pronounced changes in the medial portions of the dorsal and ventral layers in Case 2. The dorsal and medial accessory olives were involved in both cases. Just what rôle these changes produced clinically is difficult to ascertain. The olivary complex is a vast integrative system of subcortical sensory and motor ingredients and only a portion of a vast system in which multiple anatomical formations participate. Experimentally difficult to study and in view of the fact that the olivary system is very different in lower mammals than in man, observations have been variable and frequently contradic-



FIG. 1.—(Case 1.) Photomicrograph of area F B of frontal lobe (von Economo) showing the diffuse involvement of the cortex most marked in the third and fifth layers. Thionin stain × 44 (thickness of section 25 μ).

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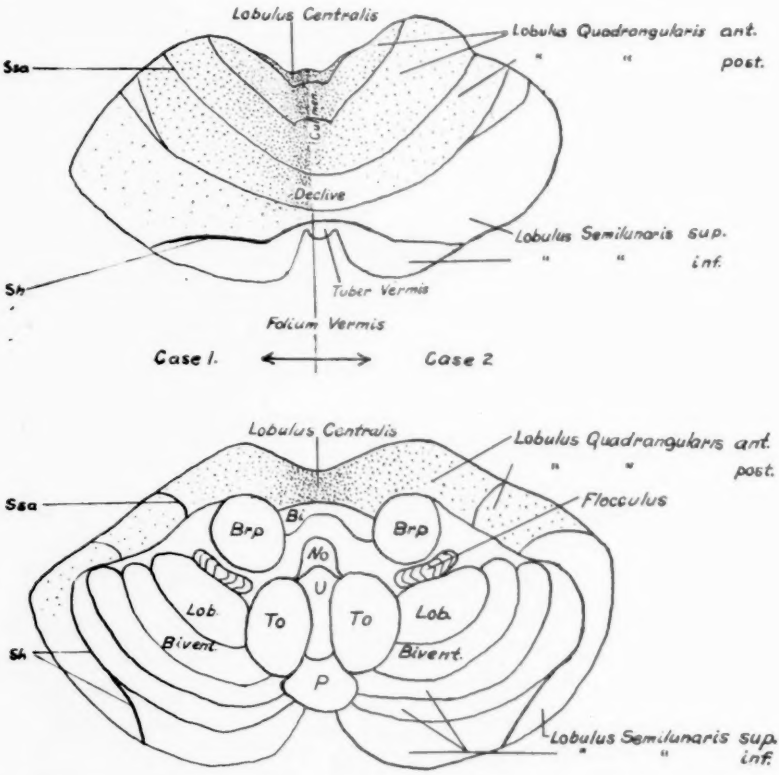
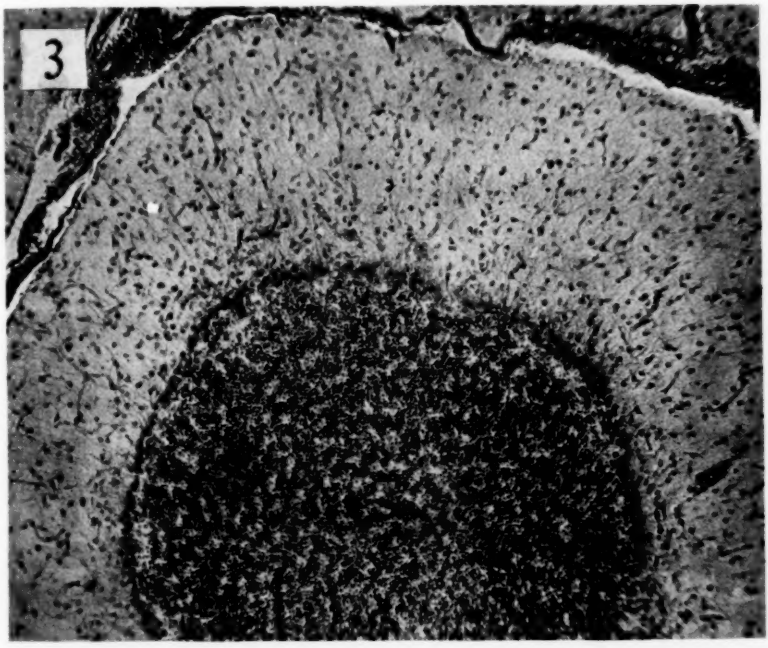


FIG. 2.—Schematic drawing to show the extent of the involvement of the Purkinje cells in the cerebellar cortex. The intensity of the stippling denotes the degree of involvement. For example, the process is most marked in the superior vermis and diminishes lateralwards into the cerebellar hemispheres.

Legend.

Bi—Brachium conjunctivum.
Brp—Brachium pontis.
Lob. Bivent.—Lobulus biventer.
Lobulus Centralis—includes the alæ lobuli centralis.
No—Nodulus.
P—Pyramis.
Sh—Sulcus horizontalis.
Ssa—Sulcus superior anterior is the same as the sulcus primarius of Bolk and Kuithan and the fissura prima of Elliot Smith. This sulcus forms the posterior boundary of the anterior lobe.
To—Tonsille.
U—Uvula.

To the left of the midline is the extent of involvement of the cerebellum in Case 1. Note that the lesions are symmetrical in extent and severity. Case 2 is represented to the right of the midline. Note, similarly, that these lesions are also symmetrical.



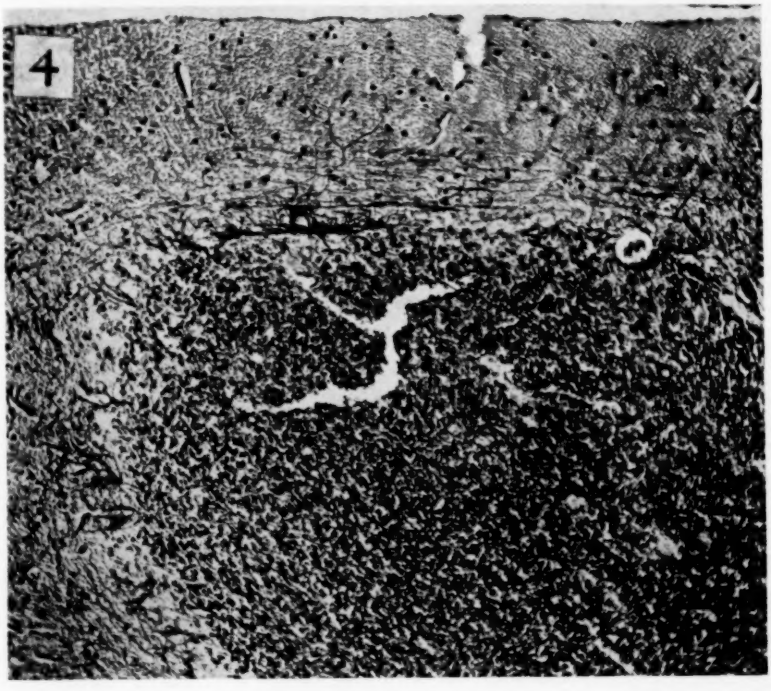


FIG. 3.—(Case 1.) Photomicrograph of the culmen to show the loss of Purkinje cells and the hypertrophy and hyperplasia of the neuroglia cells in Bergmann's layer. The molecular and granular layers are of normal thickness and apparently well preserved. The lepfomeninges contain moderate numbers of macrophages filled with lipochrome pigment. Thionin stain; × 100.

FIG. 4.—(Case 1.) Photomicrograph of the ala lobulus centralis to show the absence of Purkinje cells and the preservation of the baskets which surrounded the once present Purkinje cells. The parallel fibers of the stellate and granule cells in the molecular layer are fairly well preserved. Similarly fibers in the granular layer are present. Bielschowsky Stain; × 100.



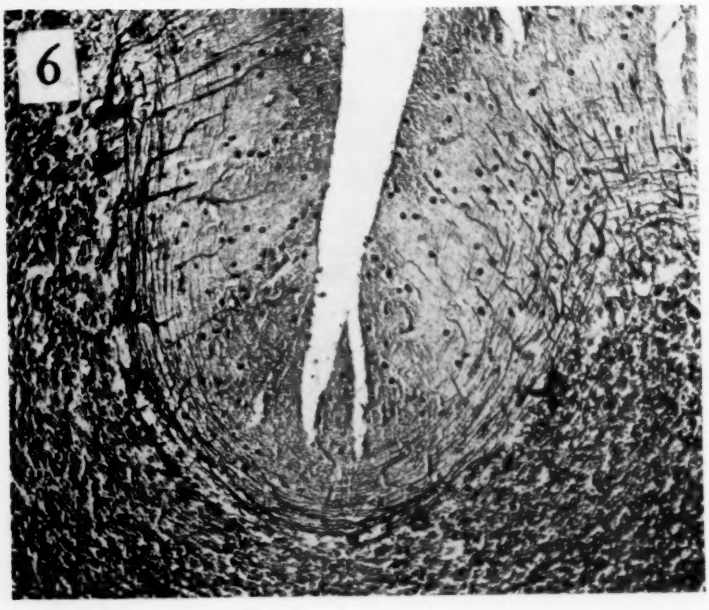
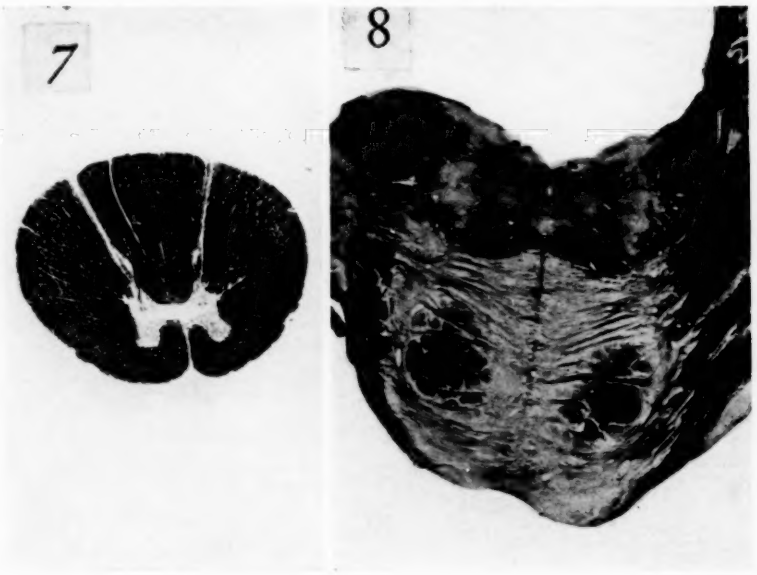


FIG. 5.—(Case 2.) Photomicrograph of culmen showing moderate hypertrophy and hyperplasia of the fibrillary astrocytes in the medullary layer. Globus modification of Cajal's Gold Sublimate Stain; × 100.

FIG. 6.—(Case 1.) Photomicrograph from the pyramis showing normal Purkinje cells and the baskets surrounding them. The parallel fibers in the molecular layer and fibers in the granular layer are well preserved. Bielschowsky Stain; × 100. Compare to Fig. 4.



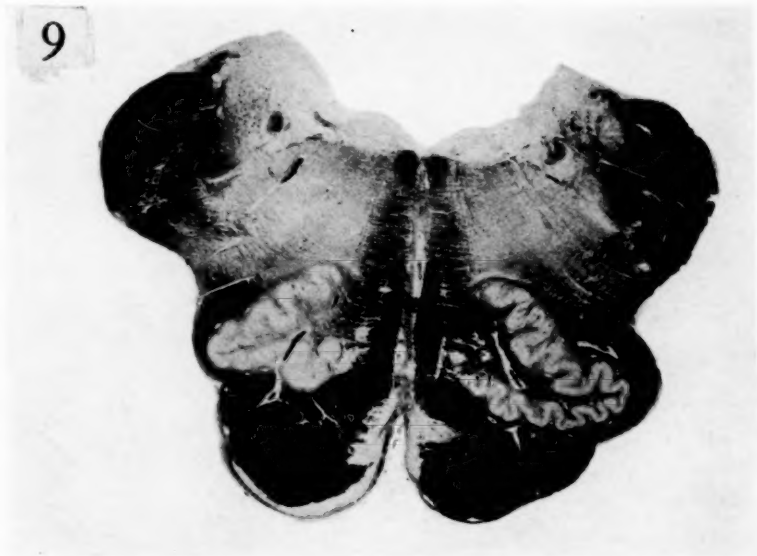
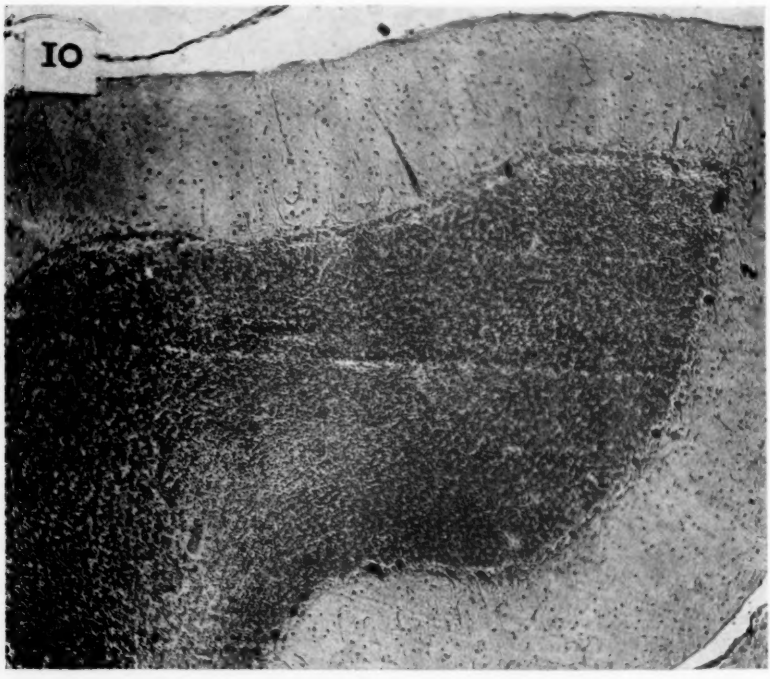


FIG. 7.—(Case 1.) Thoracic segment VIII showing no demyelinization of tracts. The central canal is moderately dilated. Pal Weigert Stain; × 4.

FIG. 8.—(Case 2.) Photograph of pons. The transverse fibers, the branchium pontes, the pyramidal tracts and the structures in the tegmentum are well preserved. Pal Weigert × 2.

FIG. 9.—(Case 2.) Photograph of medulla oblongata. The olivary bodies are rather poorly outlined due to degeneration of the peri-olivary fibers, loss of fibers between the convolutions of the olives and diminution of fibers in both hiluses. There is a diminution of the fibræ arcuatæ internæ, most marked on the left side. The fibræ arcuatæ externæ are normally abundant. The restiform bodies are well preserved. Pal Weigert × 4.



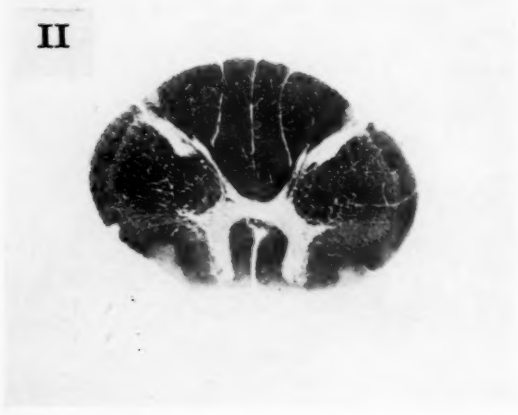


FIG. 10.—(Case 2.) Photomicrograph of lobule from the Lobulus quadrantus anterior showing diminution in number of the Purkinje cells. The granular and molecular layers are well preserved. Thionin stain × 60.

FIG. 11.—(Case 2.) Photograph of Cervical segment I, showing paling of the olivospinal or Helweg's tracts bilaterally. Since neurofibrillar stains showed no loss of neurofibrillæ and fat stains revealed no neutral fat this paling is considered normal. Pal Weigert stain × 4.

tory. It is generally believed that destruction of the olivocerebellar tracts gives rise to ataxia and rigidity. The recent work of the Salpêtriere school would suggest that the olives play a predominant rôle in the genesis of certain hypertonias and the velo-palato-pharyngo-laryngeal myoclonias. The olivary changes in both cases may account in part for the difficulty in swallowing and articulation.

The changes in the olivary bodies brings up the question as to whether these cases belong to the olivo-ponto-cerebellar group. Marie, Foix and Alajounine [1] stated that olivary changes frequently occur in the acquired forms of the primary parenchymatous cerebellar atrophies. The cases of Archambault,[35] Marie, Foix and Alajounine,[1] Stender and Lüthy,[36] Kirschbaum and Eicholz,[37] Maas and Scherer,[38] Schroeder and Kirschbaum,[39] Guillain, Bertrand and Decourt,[40] Guillain and Bertrand,[41] and Vincent and Victoria [42] showed changes in the olives. The olivary changes in the case reported by Holmes [20] were considered secondary to the cerebellar lesions. Similar interpretations have been made by Bielschowsky, Bouman and Sillevis-Smith,[43] Lhermitte,[28] and Marie, Foix, and Alajounine.[1] Holmes and Stewart [44] have found marked changes in the olives of the opposite side as early as seven days after the occurrence of an acute and complete destructive lesion of the cerebellar cortex. There is a close correlation of the regions of the involved cerebellar cortex and the changes in the inferior olives in the cases reported here to the observations made by Holmes and Stewart [44] in their study. The evidence would suggest that the olivary changes are secondary to the cerebellar lesions in the present cases.

Occurrence of Mental Changes in Cerebellar Atrophies.—Mental disturbances occur much more frequently than is generally believed. In the congenital forms of cerebellar atrophy idiocy is usually present. In Friedreich's ataxia, Saquet,[45] Mollaret,[14] Long,[46] Trelles [47] and others have found mental retardation of variable degree. The two cases of degeneration of the spino-cerebellar tracts reported by Greenfield [48] showed marked mental symptoms.

In the more acute forms of cerebellar degeneration Mathieu and Bertrand [49] have pointed out that mental symptoms are not uncommon. The three cases of Schroeder and Kirschbaum [39] and the

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two cases of Bogaert [50] and Bogaert and Bertrand [51] showed marked mental deterioration. Pathological studies revealed an olivo-ponto-cerebellar degeneration and atrophy of the cerebral cortex. A similar case has been reported by Guillain and Bertrand.[41] Bogaert and Bertrand [51] believe they are justified on the basis of their study to delimit a new syndrome and call it "a subacute olivo-ponto-cerebellar atrophy with dementia."

It seems to me that to a certain degree the cerebellar heredo-degenerative conditions may be compared to Huntington's chorea. In this disease different clinical types may be distinguished (Kehrer [52]). The clinical features differed a little in each of the four families reported by Davenport and Muncey.[53] For example: In one family the malady began at an unusually early age; in another the mental symptoms developed in the absence of choreiform movements; in a third, there was scarcely any increase in the extent of the movements as time went on; and in the fourth, there was no accompanying dementia. This would suggest that in Huntington's chorea, we are probably dealing with several different morbific heredity factors at work and all of them dominant. Possibly a similar situation prevails in the hereditary cerebellar degenerations.

Etiological Factors.—As Wertham,[54] Scherer,[55] and others have stated, some pathological lesions of the cerebellum are found in almost any brain disease. Intoxication may very easily play a large rôle in the degeneration of the Purkinje cells. Chronic alcoholism was found in the cases of acquired cerebellar parenchymatous atrophy reported by Thomas,[6] Stender and Lüthy,[36] Kirschbaum and Eichhorst [37] and others. Experimentally, Ferraro and Hernandez,[56] Lhermitte,[28] Villaverde [57] and others have found that intoxication by alcohol or lead produces degenerative changes in the Purkinje cells. Murri [58] suggested that infectious processes may have played a predominant rôle in his case and Parker and Kernohan [7] see an analogy between acquired cerebellar parenchymatous atrophy and the "louping-ill" of sheep in which, apparently, a selective destruction of Purkinje cells is the outstanding feature.

The possibility that ischaemic changes may produce changes in the Purkinje cells has been suggested by the numerous observations in which cerebellar ataxia and epilepsy were associated (Thorpe,[21] Bogaert,[50] Hähnel and Bielschowsky,[59] Bielschowsky, Bouman and

Silevis-Smith,[43] etc.). Spielmeyer,[60] Liebers[61] and others have noted that the changes in the hippocampus and the loss of Purkinje cells in the cerebellum are a result of angiospastic constrictions in those regions which have an unsatisfactory blood supply. The pressure to which the superior surface of the cerebellum is subjected by the tentorium and the weight of the brain above it has been suggested as playing an important rôle by Hassin.[30]

Thus numerous factors may separately or collectively play a rôle in the production of degenerative changes in the Purkinje cells of the anterior and superior portions of the cerebellum. In such a condition as here reported there must be an abiotrophy of the Purkinje cells which under the various possible factors mentioned above expose them to premature decay.

SUMMARY AND CONCLUSIONS.

A hereditary form of ataxia occurring in five members of a family traced through three successive generations is described. The clinical and post-mortem studies of two brothers belonging to the third generation are reported.

The disorder appears between the ages of 40 and 50 years and is characterized by a steady and rapid progression so that death occurs within two years after the first appearance of symptoms.

The onset is usually insidious. The earliest symptoms in the two cases reported were dysphagia and dysphonia. A progressive ataxia of the lower extremities and later of the upper extremities develops. Towards the end, mental symptoms indicative of organic disease of the brain occur. In Case 1, ataxia was the outstanding symptom; in Case 2, mental deterioration was the predominant feature. The cerebellum in both cases showed no gross atrophy. Histologically, the essential changes consisted of a selective destruction of Purkinje cells with preservation of the basket fibers in the superior vermis and adjoining areas of the cerebellar hemispheres. In both cases the olivo-cerebellar fibers were diminished in number, and loss of nerve cells in the medial portion of the inferior olives and the medial and dorsal accessory olives were observed. It is suggested that these latter changes are secondary to the cerebellar lesions.

The frontal and parietal lobes were atrophied in Case 2. No gross atrophy of the cerebrum of Case 1 was present. Histologically, a diffuse reduction of cells most marked in the third and fifth layers of the frontal and parietal cortex was found. These changes were more severe in Case 2 than in Case 1.

The degeneration of the Purkinje cells is probably due to an endogenous degenerative process or abiotrophy. However, other factors possibly play a rôle such as infections, intoxicants, ischæmia, and pressure of the tentorium.

It is suggested that some of the hereditary and familial forms of cerebellar ataxias may occur in two distinct forms. These are the olivo-ponto-cerebellar (ascending or cerebellopetal) type and the primary parenchymatous (descending or cerebellofugal) type. The two cases reported here belong to the latter type.

I am grateful to Dr. John L. Van De Mark of the Rochester State Hospital for his kindness to allow me the use of the clinical record and the privilege of studying the brain of Case 2.

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DISCUSSION.

DR. ADOLF MEYER (Baltimore, Md.).—These cases belong to a group that is exceedingly interesting from a general pathological point of view. By the way, may I make an appeal to this Section to head the word "pathology" as not identical necessarily with structure. Most of the time it was used in this presentation it ought to have been structural, then we would know what is meant. We are in continual danger in our relations to the Department of Pathology, so-called, which is pathological anatomy, and presumes to be pathology in general, which it isn't, as a rule. There is a lot of so-called pathology which is not pathological at all. Pathology is an understanding of lesions, an understanding of processes, but not the existence primarily. We often hear that there is no pathology of mental disease, which is nonsense.

This group of cases is interesting because we know that relatively little attention has been paid to the cerebellar involvements, except from the autopsy

point of view, and then from the general point of view of ataxia, and in retrospect, the involvement of the mental condition.

It was my good fortune 42 years ago to receive one of the cases of Sanger Brown's cerebellar hereditary degenerations, which at that time probably gave the best presentation of hereditary degeneration in the cerebellar system. Since then, a number have been presented. The one that Dr. Akelaitis has given us seems to have the peculiarity of having been studied from a histopathological point of view, histo-structural point of view, as well as from the point of view of general degenerations.

The varieties that occurred are those that might be called the three-drive group, which is the segmental involvement, where you get an exceedingly interesting disturbance especially between the connection of the cerebrum and the cerebellum. Then you get a variety of cases in which the localization or the picking out of parts is not as clear and as systematic.

I have in my collection a case that I had an autopsy of 40 years ago, at the Worcester Hospital, in which the general picture was that of a chorea, an exceedingly complex affair which is difficult to reconstruct from memory. In those days the differentiations were not as clearly understood and followed up, but in that case there was a general atrophy of the cerebellum. There was a disappearance of the Purkinje cells. There was no disturbance of the afferent system as far as I am aware, no disturbance of the cerebellar system, so evidently here we have a case of disturbance difficult to understand in connection with striatal disturbance. We evidently are dealing with an exceedingly interesting form of an insidiously developing but late developing disturbance which Dr. Akelaitis has described carefully, in a very informing fashion.

From the point of view of the rôle that these cases play in the general picture of the structural data from the point of view of psychiatric involvement, these cases are interesting, but we shall have to recognize the various patterns, and those are not particularly well worked out as yet. That the cerebrum and the cerebellum are working together a great deal shows in that massive connection that exists in the cortical pontile and the hemisphere development of the cerebellum. It has been shown especially by Dr. Bailey that the cerebellum has played a rôle that goes considerably beyond what one usually thinks, inasmuch as the intestinal movements are involved also in what you might call an ataxia in the experimental cerebellar animals.

I do not feel quite sure with regard to the characterization of the findings in the cerebrum. After all, those deficiencies in the third layer, so-called, and various agents in the regions in the cortex that do not show as many cells as they might, occur so often that one has to be rather careful. If it were possible in a new case of the kind to see whether there are progressive cell changes, let us say not only fields in which there are relatively fewer cells, but progressive cell changes, we would be much better off.

It is valuable to have this family thoroughly studied. It will be important to know whether in a careful neurological examination on the part of those who are not involved as yet there might be evidences of an under-development,

of the resistance of the fatiguability of the cerebellar component of function, but there again I think the chapters on diseases of the cerebellum are still among the weakest points of the neurological presentations, partly because the cerebellum does not announce itself in our conscious processes, and because the functions lose themselves greatly in the striatum and cortical processes.

DR. DAVID ROTHSCHILD (Foxborough, Mass.).—Dr. Akelaitis has given us an excellent description of two unusual cases which call attention to a subject that is still a matter of great dispute. It appears to me that most of this confusion has been due to overclassification, or attempts to delimit distinct entities on the basis of differences which do not seem really fundamental. The cases described by the author are, therefore, of special interest because they provide connecting links in a number of directions. They show, on the one hand, a strong hereditary influence, and on the other a type of involvement that has usually been observed in so-called acquired forms of cerebellar degeneration.

Instead of regarding this new combination as a new disease entity, I would be inclined to say that it points to a hereditary factor in disorders which often seem to be acquired.

The various types of cerebellar degeneration are apparently not at all sharply delimited from one another. There are many transitional forms. In some respects this case can be looked on as a transitional form. In fact, there are almost as many types described as there are workers in this field. There are almost as many classifications as there are authors, and this suggests to me that we may be dealing merely with a multitude of variations within one large group. Furthermore, it seems that the whole group has been considered too much apart from the rest of the nervous system, in our ways of thinking, if not in description of cases.

The cases of Dr. Akelaitis provide an important connecting link in this direction, because they show an involvement of the cerebrum without responsible psychotic disturbances. Does this mean that the cerebral involvement is merely an accidental or incidental complicating factor? I doubt it.

Dr. Akelaitis has pointed out that mental illness has been frequently noted in various types of cerebellar degeneration. To me, this indicates the necessity of considering these disorders in the broader framework of the whole nervous system. Certain authors have suggested a selective senescence in later cerebellar cases. This brings up the question of a relationship to such disorders as Pick's disease, Alzheimer's disease, in which early senescence has been suspected to play a rôle.

In one of my previously published cases of Alzheimer's disease, there was widespread cerebellar damage of the type described by the author, and Dr. Lowenberg has observed cerebellar degeneration in the case of Pick's disease. Of course it is well known that degenerative conditions such as those seen in senile and alcoholic disorders are associated with cerebral involvement. We proceed from the whole brain to the cerebellar as in the opposite direction, as is usually done. We must seriously consider the possibility that they

are nothing but extreme and special examples of a more general disorder of the nervous system in which a variety of particular factors are concerned.

These special factors, such as heredity, and other things, should be given full value, but it is my impression that progress in our real understanding of these conditions is likely to be made not so much by their isolated consideration, but by attempting to relate them to the degenerative conditions of the brain in general.

Dr. Andrew J. E. Akelaitis (Rochester, N. Y.).—In answer to Dr. Meyer's question regarding the changes in the cortex, it is true that we did find sclerotic changes in quite a few of the remaining nerve cells, and also hypertrophy and hyperplasia of the neuroglia around these degenerating nerve cells.

My intention in regard to Dr. Rothschild's comments was not to create a new disease entity here, but simply to try in a small way to bring out the fact that probably what is now generally recognized as two very distinct forms occurring in the acquired atrophies of the cerebellum also occurs in a hereditary form.

As I mentioned in the beginning of the paper, I don't believe it is justified at this stage of the game to accept any drastic idea that there is no sense or reason to these degenerative conditions, that we are dealing here with a very vague, general degenerative condition throughout the nervous system. I think we are not justified in arriving at that conclusion as yet, and I feel one should be encouraged to try to delimit certain definite syndromes.

It is true as regards cerebellar changes that they occur in many conditions. There are probably few neurological conditions and neuropathological conditions in which we do not find some changes in the cerebellum.

I believe that these cases are interesting from the point of view that the lesions in the cerebellum were so elective in their regional distribution.

A CONSTRUCTIVE CRITICISM OF CERTAIN HOSPITAL PROCEDURES.*

By KARL M. BOWMAN, M. D., New York City.

I shall endeavor to give a number of somewhat disconnected observations and criticisms concerning hospital procedures, with certain suggestions as to how I believe we may improve our hospitals for mental diseases.

In every large institution there is the tendency for all administrative procedures to become highly standardized and mechanical. No set of rules will cause a hospital to run smoothly or efficiently, and the more satisfactory the personnel the fewer the rules that are necessary. The proper functioning of any institution depends more on the personality of the key individuals and their relationships with each other than on any form of regulations. Rules and regulations, in my opinion, should be regarded as a general indication of how one should ordinarily proceed. It should be emphasized that in times of emergency employees will carry out whatever procedures seem necessary, even to the extent of disregarding some of the regulations of the hospital. There are unfortunately some employees who at times demand rules so that they may be relieved of the responsibility of thinking and of making decisions. In such cases elaborate sets of rules merely confirm the tendency to develop a low-grade routine which is harmful to the hospital. The question is whether we are thinking of the best care of our patients or whether we are more concerned with an organization which runs quite smoothly on paper and which may appear to do so in practice but which fails to accomplish the purpose for which it is designed, namely, to furnish the maximum degree of good care for the patients. It is possible for a hospital to appear to function in a satisfactory fashion, to appear well organized and still to be doing very badly as far as its actual care of patients is concerned. It is worth while, therefore, to stop occasionally to review the various procedures carried out in our hospitals and

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to ask ourselves whether these procedures are accomplishing the end for which they were designed, namely, the best policy for the care of our patients.

One of the oldest jokes in medicine is the story about the nurse who awakened the patient in order to give him his sleeping medicine. Yet, I wonder in how many hospitals is there a standing order that patients who have been given hypnotics the night before shall not be awakened the next morning. In my own experience I have found it a common practice to give excited and restless patients heavy doses of hypnotics in order to make them sleep and then to wake them up for breakfast the next morning. These patients have been given a powerful hypnotic in order to make them sleep and rest and yet they are not allowed to secure the maximum effect from this drug. I have made it a standing rule at Bellevue that our psychiatric patients who are given hypnotics shall be allowed to sleep as long as possible the next morning. Most of us will agree, I am sure, that for patients who are excited or restless, sleep and rest are of the utmost importance and yet we deliberately cut short these hours of sleep and rest for the sake of a standardized routine.

Along the same line I would like to point out that the hours for sleep and the hours for meals in our hospitals are not in accord with those to which most of our patients have been accustomed before coming to hospital. This puts an added strain on their ability to adjust to a new procedure at a time when they are already maladjusted and trying to make the new adjustment to hospital life. I know of one hospital in which all patients are awakened at 5.30 in the morning in order to have their faces and hands washed before the night nurses go off duty at 6 o'clock. Many of these patients could easily sleep until 7 or 7.30, and I do not believe that the value of having the hands and face washed is equal to that of one or two hours more of sleep. I believe that procedures of this sort are dictated by the standardized routine to which I have referred before, which gives an appearance of efficiency but which really fails to accomplish the fundamental purpose of the hospital.

Rest is one of the most important procedures in treating our mental patients, particularly on our excited and disturbed wards, and we should, therefore, make every possible provision and afford

every opportunity for patients to secure rest. There seems, however, to be a current practice in hospitals that patients must never lie down on beds. I do not know who first promulgated this rule, but it has come down as a tradition and is so firmly ingrained in the personality of all nurses that it is almost impossible to arrange for patients to lie down on beds during the daytime. In the past I have made arrangements for patients to have specified hours to lie down on their beds and relax, only to find that in a short time the practice had stopped for some unknown reason. There is apparently something in the nature of a nurse that forces her to keep a patient off a bed. Perhaps some of my psychoanalytic friends can explain it. I have the impression that the great insistence on an immaculate looking bed has been so deeply ingrained in her from her period of nurse's training that it is almost impossible to desensitize her. It seems a peculiar situation that one should have continuous baths and packs and other procedures to try to quiet disturbed patients and then carefully prevent them from lying down and relaxing when they feel in the mood to do so. We now have a standing rule at Bellevue that patients on the disturbed wards are to be encouraged to lie down on their beds at any time.

An ex-patient of one of our state hospitals, a man of high intelligence and an excellent sense of humor, told me of the beautiful library for patients at the hospital where he had been. No patients, however, were allowed to use the room, the books were never given out because it was felt that the patients might destroy them. I believe that many of our hospitals have certain equipment and facilities available for patients but never use them for fear that the patients might destroy them. The same ex-patient stated that whenever he did manage to secure a newspaper or magazine he never dared to put it down because some mysophobic nurse would immediately pick it up and remove it from the ward because books, magazines and newspapers lying about cluttered up the ward and made it look untidy. There is no doubt that cleanliness is important, and I shall never forget the celebrated foreign psychiatrist visiting one of our well-known hospitals in this country who exclaimed after being shown through the hospital, "Ah, but it is too clean!" I wonder if sometimes the demands for neatness and orderliness in the appearance of the ward are not enforced to the detriment of the patient. A spotless ward with every bed and chair

in geometrical position, with nothing out of place may delight the eye of housekeepers and inspectors, but I question whether it is the best atmosphere to aid in the recovery of our mental patients. The presence of newspapers and magazines lying about in the ward is to me a good sign, a sign that those in charge are thinking more of the welfare of the patient than the appearance of the ward.

When a patient is in a destructive mood and destroys things about him, he is often isolated in a room and everything possible taken away from him so that he may tear his clothing or mattress or even tear down the walls of the room. If such a patient can be provided with things of no value which he may destroy, it is possible that he will work off some of his destructive tendencies on such material. Extra newspapers and magazines are excellent material for such patients and he can tear at these to his heart's content. Possibly more valuable things will be saved by such procedures.

While at present there has arisen a certain group, particularly abroad, who decry the value of hydrotherapy and continuous baths, most of us in this country consider them of value in the treatment of disturbed patients. I believe that most of our hospitals use the continuous baths mainly in the daytime and many hospitals never have the continuous baths going at night. This seems to me exactly the wrong procedure, and for disturbed patients I regard the continuous bath as of more importance at night time than during the day. Here again one has to meet the resistance offered by the institutional force who often object to new procedures and who can discover convenient reasons why things cannot be done in a certain way. At Bellevue we now operate our continuous baths 24 hours a day. We are able, therefore, to give hydrotherapy to a large number of patients, and also at night we manage to have some of our most disturbed patients away from the rest of the ward in the continuous baths, thus making the ward more quiet. We are commonly able to utilize the tubs for three sets of patients in 24 hours.

We usually find that from 9 to 11 every morning and from 2 to 4 every afternoon are fairly active hours for our patients; that occupational therapy, physiotherapy and many similar procedures are going on. In a recent article read before this Association, Bonner pointed out that accidents were most likely to occur during

the hours of the day when there was little activity going on for the patients. My own experience has also been that accidents and injuries and complaints of mistreatment by patients will invariably increase whenever there is a marked decrease in the nursing staff or when various activities for patients are discontinued. The question comes up, therefore, whether it is not possible to stagger the hours of employees in occupational therapy, physiotherapy and similar activities so that all of them do not come at the same hour and so that they will spread out better over the entire day. Often there is a marked cessation of activities for the patients on Saturdays and Sundays. At Bellevue our occupational therapists have been spending Saturday mornings visiting other institutions and carrying out activities to keep them in touch with what was going on in the field of occupational therapy. Dut to visiting hours it has not been possible to send our patients to occupational therapy on certain afternoons. I have suggested, therefore, that our occupational therapist might utilize one of these afternoons for outside work and spend Saturday morning at the hospital. There is also the question as to whether a physiotherapy department should not function in the early evening hours. Massage, packs and soothing type of hydrotherapy may well have their greatest value just before the patient is ready for bed and may enable some patients to secure a night's sleep without the aid of hypnotics, whereas this same soothing physiotherapy given in the early morning followed by activities on the ward for the patient would have nothing like the same value.

The increase of smoking has led to certain further problems. Not many years ago there was no provision for women smoking. Now custom allows women to smoke freely under the same conditions as men. Should women patients be allowed to smoke freely or should endeavors be made to restrict them? I do not believe that we can make any distinction between the sexes and that there should be the same attitude towards smoking for women as for men. Smoking is not a particularly healthy habit, and in many persons it has become a somewhat neurotic habit with an obsessive quality. It is probably well to discourage smoking among our mental patients in the majority of cases. However, it may have a special value particularly for newly admitted patients. If we take a patient who is already in an abnormal mental state and deprive

him of tobacco to which he is accustomed, we are likely to increase the emotional tension of the patient and also to cause him to develop an attitude of antagonism toward the hospital and those depriving him of his accustomed cigarette. I have been particularly struck by the fact that patients who are accustomed to smoking and who are restless at bed time may quiet down and go to sleep if allowed a cigarette at that time, whereas, if it is refused, they become still more restless. I would state unhesitatingly that it is better to give a patient one or two cigarettes at bed time than to dose him with barbiturates or other hypnotics. I believe that intelligent observation will indicate that the amount of hypnotics can be diminished by the judicious use of cigarettes at bed time.

As an illustration of the intelligent disregard of routine, I would state the following instance: Patients are not allowed to smoke in bed. A short time ago I discovered a woman patient smoking in bed, with the nurse standing nearby. The ward psychiatrist then told me that this patient had agreed to eat her meal if she were allowed to smoke a cigarette and that until that time it had been necessary to tube-feed her. After smoking the cigarette, the patient did eat her meal. This brings up the problem of hard and fast rules as against individualization in the treatment of patients, and illustrates what I mean by stating that no set of rules will secure intelligent or adequate treatment for patients. It will depend on the personnel and the personnel must be allowed considerable latitude in carrying out hospital regulations.

In organizing our wards for children and adolescents, our experience has been that it is better to group small boys and small girls together rather than to have small and large girls together and small and large boys together. From the general administrative standpoint of running such wards, the providing of teachers and various types of recreation and activities on the ward, it is better to have all small children together.

Various attempts have been made to overcome popular prejudice against psychiatry and to link it up more closely with the rest of medicine. These efforts should unquestionably be encouraged, but I would like to bring up two points: First, I do not believe that we will accomplish much by changing the names of our institutions. History shows that we have been attempting this for over a hundred years without much success. It is of interest that the

title of hospital was rejected over a hundred years ago for our institutions for mental diseases because it was felt that the word "hospital" carried with it a certain stigma and disgrace since only paupers went to hospitals. The words "retreat" and "asylum" were felt to be much better terms. Now that we have come around in a circle and are using the term "hospital," it seems well to question whether there is any great point of introducing other terms. While I see no objection to doing it, I am very skeptical of our accomplishing much by such attempts. The second point is the development of psychiatric wards in general hospitals. This I regard as most desirable and something which should be encouraged. On the other hand, I feel that there is great danger that our psychiatric wards in general hospitals will wish to take only psychoneurotics and so-called "nice" cases and will insist that the so-called "insane" cases be relegated to isolated institutions. This, I think, will merely throw the great bulk of psychiatry back to its previous isolation and will be harmful to both psychiatry and medicine generally. We must insist that psychiatric wards in general hospitals are really psychiatric wards and that the general hospital with psychiatric wards shall not seek to evade the more acute psychotic patients. I feel that our psychiatric hospitals have not emphasized sufficiently the great wealth of medical, surgical and other types of cases which would be of interest to the various specialties in medicine. Our psychiatric hospitals are full of most interesting and obscure cases and the rest of medicine is largely unaware of this fact. I feel that in general we have somewhat oversold mental hygiene and psychotherapy and have not paid sufficient attention to the great wealth of clinical material which we have in our mental hospitals and which would be of great interest to the rest of medicine. There are unlimited opportunities for cooperative research and teaching, to which very little attention has been paid.

I would like to cite one example of the value of the general medical man to psychiatry. In the Psychiatric Division at Bellevue Hospital we have eight medical and six surgical interns, with the attending medical and surgical group from the regular hospital. The medical and surgical group made frequent use of the Levine tube, leaving it in position. It finally occurred to us to utilize this in treating disturbed patients, and we have now made definite

use of the following technique: The patient is placed in a camisole and the Levine tube inserted. A suitable amount of fluid is given the patient and the tube is then left in place strapped to the face by adhesive. If desired, a number of feedings can be given in a short period of time. One may start out by giving water which will be rather rapidly absorbed, giving it at frequent intervals, ending up with a feeding of nutritive material. One of the most important things in excited patients is to force fluids and get rid of the dehydration. This method is, I think, ideal. It is also of value where a patient is regurgitating any feeding. In such cases, small feedings can be given every fifteen minutes or so.

Finally, I would like to re-emphasize the dangers of stereotyped routine and the necessity of constantly reviewing all administrative and clinical procedures with a willingness to discard any procedure which is unsatisfactory or where another method appears more desirable. We must not forget that the purpose of a hospital is the care of sick persons, but at times we may become so interested in structure, in organization or in the smooth running of the institution that we lose sight of the fundamental fact that the test of a good hospital is how well the patients in that hospital are cared for.

DISCUSSION.

DR. ARTHUR P. NOYES (Norristown, Pa.).—This paper is a valuable one. It is often wise to stop and take stock of things, and it is well that Dr. Bowman has called attention to some of these matters. We won't acknowledge it, of course, but I fear that too often the hospital exists for itself rather than for the patient.

Dr. Bowman called attention to rules. We must all agree that while rules are necessary, they should be, as he has indicated, such that they will not destroy the initiative of the young members of the staff nor operate against the development of personnel. After all, emphasis should be on the purpose of the rule, the purpose of the procedure under consideration rather than the rule itself.

I call attention, as Dr. Bowman has in a little different way, to the highly artificial life led by the hospital patient. It departs widely from the type of life that the patient usually leads, and injected all through it is an artificial condition. He has called attention to the abnormally early hours expected of patients. They almost invariably exist in state hospitals for mental diseases. I don't know just how they can be changed, but certainly it is a subject that will bear study.

In most of the state hospitals the hour for the evening meal is too early, arranged, of course, for the convenience of the employees, and while it often seems necessary, that, too, is a subject which needs study. Frequently there are abnormally long intervals between the evening meal and that of the following morning.

Many of these practices, particularly in the state hospitals, that should be studied and revised, exist because of the small number of employees and the long hours on duty, particularly in the case where there are but two shifts. Many of those conditions could be improved with the establishment of the eight-hour schedule. With the establishment of such, there would be an improvement by overlapping the night and day shifts, which would help out a great deal.

I have noticed in studying the problem of establishing an eight-hour schedule in New York a committee was appointed to study the matter, and while they made some rather definite recommendations, it seemed to me helpful in arranging those hours to provide for this overlapping of night and day shifts. The morning hour is always a difficult one in large wards.

One of the problems in the state hospitals is a fixity of routine. The routine would be more flexible if an adequate number of ward employees were available.

Patients in the public mental hospitals are not permitted, to a sufficient degree, to keep personal attitudes in their rooms. We all recognize the tendency for many patients to collect trash, and how the nurse, a good housekeeper, wants to keep all those picked up, but I think there is a tendency to stress that rather than the comfort and pleasure of the patient.

A few years ago in Rhode Island we had occasion to remodel a building and to equip a ward for the insane. In it we put steel lockers. In no instance did any trouble result. It added greatly to the satisfaction and comfort of these patients. If it can be done in a ward for the criminal insane, surely it can be done for the general population of the hospital.

Dr. Bowman mentioned the use of continuous baths over 24 hours. I am thoroughly in sympathy with that. It is something that I feel we should employ more and more.

He mentioned another excellent practice, which, however, is difficult in hospitals with limited personnel, that is the employment of physiotherapy, hydrotherapy, and other sedative measures, in the evening. That is something that is not usually employed, I think, in the state hospitals. Perhaps, however, with the increasing practice of the eight-hour schedule, that will be possible, and it is something that should be borne in mind.

He mentioned the subject of smoking for women patients. I feel that hospitals should provide adequately for that. I was much interested in the case he mentioned of the woman smoking in bed with a nurse standing by. I suspect that is an indication that Dr. Bowman has been teaching his personnel to think rather than to worship rules, and he is to be congratulated.

In his recent book on "Administrative Psychiatry," Dr. Bryan says that tradition is a curse in mental hospitals. Perhaps it is a strong statement, yet

we all know there is a great deal of truth in it, that we need to study all these things which we have been taking as a matter of fact. The problem of changing some of those things that have been the custom for the last 40 or 50 years is a difficult one, but one that should be attempted.

Too many rules for employees as to their own personal life often exist in institutions. Here, too, we could add a good deal to the satisfaction of our employees if we wouldn't try to interfere too much with rules touching their personal life. It is all very nice to have notices posted in the attendants' dormitories that no smoking will be permitted, but we know that they will smoke, and they should be permitted to smoke. To be sure fires occur. If there has been a rule posted, it makes a nice alibi for the superintendent.

There are many other things touching employees. The night employees must be in bed at a certain hour, and so on, which I think we must disregard. After all, we have to remember that employees are human beings.

DR. A. H. BRAVERMAN (Bedford, Mass.).—It is always inspiring to behold a pioneer, and by his paper, Dr. Bowman may be looked upon as such because of his efforts to break down some of the traditions with which so many of our mental hospitals are steeped.

Tradition may be defined as the transmission of ancient customs and practices through successive generations. Traditions as regards hospitals may be likened to laws on the books of a state or nation. Once they become ingrained, it is with difficulty that they are broken. Of course, rules and regulations are necessary to the smooth running of any organization; they constitute its magna charta, but there is no rule nor regulation that is devoid of human and liberal interpretation, particularly in certain circumstances. One's interpretation may prove to be faulty subsequently, but each of us has erred in judgment at one time or another, and that is only human. What is best for our patient should govern our decision in every instance, even if in so doing a few cobwebs surrounding a pillar or two of ancient tradition are disturbed.

Treatment should not be made to conform to any hard and fast set of rules. The doctor should be given latitude in exercising his knowledge, training and experience, in types of therapy change, and if he is to be hemmed in by a wall of "Don't, it's against the rules, it has never been done before," his ambition, interest and desire to be progressive will be stifled soon.

Rows of immaculate beds, highly polished floors, spotless linen, do not in themselves cure patients. Surely it is essential that the utmost degree of cleanliness shall prevail in a hospital, but to deprive a psychotic patient, particularly an excited one, of the opportunity to recline in a bed when he has the urge to take a nap, or to rest peacefully, just because he will disarrange the bed, is poor treatment.

In this connection, I am reminded of an incident which occurred while I was a student at college. The class was in the chemistry "lab"; it was at the end of the course, and the books in which we had recorded our experiments were a sorry sight; all sorts of splashes and blotches were on the pages. Word had been passed that they were to be inspected. Many of us were hard at work copying what had been written into new, shiny books, so

that we would have presentable ones to hand in. When the "prof" came in and saw what we were doing, he let us know that he would accept no new, shiny books. He wanted books that had the appearance of having been in a laboratory. The more splashes there were on the pages, the better he liked them. And so it is with our patients; let them appear like we are working with them, not against them. Let them recline in their beds, if in so doing they are peaceful and contented, instead of pacing the floor restlessly and excitedly; it is good therapy.

Suppose they are smoking while reading a paper, and having finished the paper, it is strewn on the floor, why get hysterical over that? Don't most of us do the same thing at home? Isn't it good therapy to strive for a homelike atmosphere in our wards? In the reading room of a club house which I used to frequent, there was a sign which read, "If you throw ashes on the floor at home, do it here; we want you to feel at home." If we make our patients feel at home by creating a homelike atmosphere, we are practicing good psychotherapy.

An acutely disturbed patient requires sedative therapy in the form of continuous baths and soothing types of massage, whether he becomes disturbed during the day or at night, and a trained personnel should be available at all times to administer this type of treatment. Any measure, other than giving drugs, which enhances the sleeping ability of an excited patient should be exercised to its fullest extent. The desirability of treating a psychotic patient as an individual is ideal; however, it is appreciated that in public institutions where the greatest number of these patients are cared for, there exists a certain definite impediment which all but frustrates the accomplishment of this ideal, and that is the availability of sufficient funds to cover the cost of the additional personnel which this requires.

Human flesh is heir to many types of illnesses, and mental illness is one of them. If medicine, surgery and obstetrics are practiced in hospitals, why not practice psychiatry in hospitals? Why stigmatize a person just because he has mental illness by sending him to an asylum or to a retreat, or to any other place besides a hospital? The establishment of psychiatric clinics and wards in general hospitals is a great step forward and should be encouraged vigorously. The rationale that motivated the creation of prenatal clinics, motivates the necessity for establishing the psychiatric clinic and ward in the general hospital. To the general hospital come people suffering with all sorts of ailments. It is there that the beginning of a psychiatric disease should be spotted and treated. What the pre-natal clinic has done for obstetrics, the psychiatric clinic and ward in a general hospital will do for psychiatry.

DR. DILLER (Pittsburgh, Pa).—To be a well qualified psychiatrist, a man should possess technical knowledge, he should have a good heart, and good common horse sense, and Bowman, I think, is qualified.

DR. IRA M. ALTSHULER (Eloise, Mich.).—I want to call your particular attention to the fact that in all the discussions pertaining to mental patients, we have been attempting to improve his physical condition through physical

means, whether it be by the medical man or the chemist. We have failed to apply pedagogical methods in the rehabilitation of our mental patients. In our papers here it was mentioned that a teacher must learn something from the psychiatrist, but I believe that the psychiatrist can learn a great deal from the teacher. We must apply pedagogical methods in the rehabilitation of our mental patients. We must give more ethical and character training. We must re-socialize our patients. Our work in the mental hospitals must be open long enough to admit them, but they must remain open, for we must turn them back into society.

Since I have come in contact with mental patients, I have begun to understand the meaning of deterioration. Some of our mental patients deteriorate because of our ethical *laissez faire*. What do we do for them to give them basic realities? What do we substitute for their indifference to human work and a little medical care? There are things which we can do for our patients in the form of basic realities. We must give them the things which the community at large gives to its members—music, the spoken word, expression, substitution.

Dr. Bowman mentioned here an incidence of substitution, tearing papers, and so on. There are more things which we could give to our patients for the purpose of expression. Each patient must be given an opportunity for expression, no matter how insignificant his expression is; we let him dance, we let him sing, we let him make little things, compose poems and song. We should have confidence in our mental patients, but we haven't, primarily because we isolate them, and secondly, because we leave them alone, and so I wish to sound a note in this direction. Let's have confidence in our mental patients, and let's give them basic realities.

STATISTICAL CONTRIBUTIONS FROM THE MENTAL HYGIENE STUDY OF THE EASTERN HEALTH DISTRICT OF BALTIMORE.[1]

I. General Account of the 1933 Mental Hygiene Survey of the Eastern Health District.

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The Mental Hygiene Study of the Eastern Health District of Baltimore was set up in 1934 to make an intensive investigation of the mental hygiene situation in this already well studied urban area. A description of the district and of the organization and purpose of the study has been presented by Fairbank.[2] In that account the aims of the study were stated to be, "(1) to determine the prevalence of mental ill-health, defect and instability in the area in relation to its population; (2) to discover, in as great detail as was practical, the economic, social, racial and personal problems underlying these conditions; (3) to become acquainted with the existing facilities for dealing with these problems; and (4) to devise and put into experimental operation, as part of the existing health service of the community, such administrative procedures as would seem to offer hope of effective management and prevention."

That paper discussed mainly the work in progress in connection with points (3) and (4), which make up, so to speak, the "preventive" phase of the study. The first two points, which may be considered the "survey" or "statistical" phase, will be described at somewhat greater length in this paper, which is the first and introductory report in a series in which the results of the survey of prevalence will be presented.

The phase of the study concerned with the determination of the prevalence of mental hygiene problems has so far been confined

[1] Miss Elizabeth Greene, the study's social worker, has taken part in all phases of the investigation and in the preparation of this series of papers.

[2] Fairbank, Ruth E.: Mental hygiene component of a city health district. A. J. P. H., 27: 247-252, 1937.

mainly to the calendar year 1933. The method adopted for the survey required, as the first major step, the preparation of as exhaustive an analysis as possible of the mental hygiene situation in the district during a particular limited time period. The year 1933 was selected because it was the most recent full calendar year when the study was begun, and furthermore, a complete census of the district population for that period, prepared by the Department of Biostatistics of the School of Hygiene and Public Health, was available.

A comprehensive appraisal of all mental hygiene problems which are accessible to such investigation, presented as a composite picture integrated with the population as a whole, is indispensable for an epidemiological approach to these problems. Moreover, such a detailed survey of the prevalence of mental illness, defect and instability, and personality deviations, maladjustments and inadequacies, is not only a fundamental necessity to proposed extensions of the present study, but one that should be of general interest and usefulness in itself.

The ultimate aim is a study of the relations between mental or personality disorders, and the individual, social, racial and economic conditions with which they are associated. This requires, to be at all valid and significant, knowledge not only of the instantaneous relations between disorders and their circumstances of occurrence, but likewise the trends in disorders that follow from observed trends in the circumstances. However, trends in such disorders imply a vast complexity of more or less obscure relationships, and there appears no hope of following them longitudinally until a carefully delimited and well-defined cross-section is examined thoroughly with the aim of recording all momentary relationships which it is possible to identify. Accordingly, for the present, attention will be confined to the facts of one year.

The collection of material for the year 1933 was completed during the first half of 1936, and since that time the data have been undergoing analysis. In this introductory paper there will be presented only a general summary account of the work, including descriptions of the methods of collecting the data, their sources, preparation of the data for statistical treatment, the system of classification developed by the study, and certain general facts about the

material as classified and its analysis. The detailed results will be presented in a series of papers, the first of which will follow in the next issue of this JOURNAL.[3]

COLLECTION OF THE DATA.

For the purpose of this investigation, as explained by Fairbank (*loc. cit.*), cases that have actually attracted attention because of mental disease, defect, instability or malfunctioning, were examined for all available facts which appeared to be significant. For records of persons presenting mental disease or defect of sufficient severity to bring them under actual psychiatric treatment or institutionalization, search has been made of the name files of the mental hospitals, mental clinics or custodial institutions, to which there is any reasonable possibility that patients from the district might be sent. The records of children in the public school system, in particular those in special classes for retarded or defective children, and those who have come to the attention of the psychoeducational clinic and the attendance department, have been gone over. Records of clients of the social service agencies serving the area have been searched for individuals showing difficulty in adjusting to their social, familial, educational or industrial environment, and the records of individuals appearing in all courts and correctional agencies of any character have been scrutinized.

The general types of difficulties or problems found in this way were major and minor mental illness, mental defect, psychopathic personalities, behavior and school adjustment problems and delinquency in children, and in adults, instability of one kind or another manifesting itself in such patterns as domestic difficulty, alcoholism, cruelty and neglect of children, promiscuity, inability to hold a job, conflicts with the law, and the like.

The procedure in general has been to abstract, from the records of the various sources, a uniform case card for each individual who was a resident of the Eastern Health District in the year 1933 and who presented some form of behavior difficulty. The following

[3] Cohen, B. M., and Fairbank, R. E.: Statistical contributions, etc. II. Psychosis. 1. The incidence and prevalence of psychosis in the Eastern Health District in 1933 (to be published).

data, wherever available, were transferred to these individual "source cards":

a. Identifying information—name, residence, age, sex, marital status, birthplace, birth date, religion, occupation, and date of contact with the institution or agency.
b. Complaint or problem presented by the individual.
c. Personality traits of the individual.
d. Home life and economic status.
e. Name, birthplace, occupation and personality traits of father, mother and spouse.
f. School record and intelligence rating when test had been made.
g. Physical condition.
h. Treatment.
i. Outcome.
j. Social agencies known to have had contact with the individual or his immediate family.

As was expected, much duplication of material resulted from the fact that the same individual was often found in the records of more than one source of information. To identify such duplication a name index file was set up containing a card for each individual who was found, together with the names of the various institutions and agencies with which the individual had contact. These cards were checked with the 1933 census of the Eastern Health District to determine for each individual his census household number [4] and individual number in the household, which were added to the card, thus providing a cross-index with the census. They were likewise checked with the files of the Henry Phipps Psychiatric Clinic out-patient department and the State Board of Mental Hygiene to ascertain the possibility of any prior history of a clinic examination or hospital care for mental disorder.

The various source cards relating to the single individual were assembled and from these was prepared a master card (the "individual's summarized history card"), containing all the information obtained about him from the various sources investigated.

[4] The unit of enumeration in the census is a "household," consisting of the members of a family and the relatives, lodgers and servants who live with the family regularly. Each household is represented by a single schedule, which lists the various individuals with their necessary identifying information, and orders them numerically. Accordingly, each individual is identified by a "census household number" and his "individual number in the household."

The individual was, in turn, identified with the census household to which he belonged and a description of the household as a unit prepared, this information being added to his summarized history card.

Altogether 3796[5] histories have been obtained. The following list shows the sources in which they were found and the frequency with which each is represented. This list includes, of course, all duplications.

Psychiatric Hospitals, City, State, and Private (9)	404
Psychiatric Clinics (5)	423
Family Welfare Agencies (4)	1017
Child Welfare Agencies (3)	246
Public School System	
Special Classes for Mentally Retarded Children	368
Division of Special Education	159
Attendance Department	65
State Training School for White Feebleminded	41
Waiting List of School for White Feebleminded	16
Waiting List of Proposed School for Negro Feebleminded	15
Penitentiary, Probation Department, and Court Medical Department	42
Court of Domestic Relations	116
Police Court Dockets	1861
Juvenile Court	246
Training Schools for Juvenile Delinquents (8)	125
Death Certificates	14
Census	41

Classification.

The formulation of a system of classification was a problem of exceptional difficulty. The individuals accepted as presenting mental hygiene problems had to be grouped in such a way as to present a comprehensive descriptive review that was sound from the psychiatric and sociological points of view, and at the same time was amenable to quantitative treatment. The first attempts to rely entirely on the existing classifications were unsuccessful for several reasons: (1) The diagnoses and descriptions of problems and personalities which appear in the records, coming from a

[5] Actually, 3881 histories are in the study's files, but 85 of these are of dependent, neglected children and victims of circumstances, who present no overt problems, but who appear worth keeping under attention because of the situations in which they are living.

great variety of sources, showed little uniformity in terminology or consistency in interpretation. (2) The classifications in general use are built around more limited types of problems than the wide sweep of reaction types encountered. (3) For many types of problems no classification of any sort exists.

By reviewing the types of disorders found in the whole set of records, setting up a general schema, and after detailed study of each case, making appropriate alterations, additions and subclassifications, a satisfactorily working classification was evolved. This empirically constructed classification appears to cover adequately the whole range of types and problems which the material of the study presents. The most salient feature of the classification is its division into two main parts for the purpose of considering each individual from two points of view: (A) his reaction type, and (B) the psychiatric and social problems he presented in 1933. The first part comprises the psychiatric classification proper, while the second augments this with those facts about the individual's personality, behavior and general social difficulties which serve to complete the picture of his mental hygiene status. The fact that such a dual system provides classes of types and problems in a wide variety of combinations makes it possible from the classification alone to describe the individual with a degree of accuracy not otherwise attainable The classification in very condensed form is as follows:

A. Reaction Type.
   1. Psychotic.
   2. Post-psychotic.
   3. Psychoneurotic.
   4. Epileptic.
   5. Psychopathic.
   6. Maladjusted, not included in the above types.

B. Psychiatric and Social Problems Presented by the Individual in 1933.
   1. Adult Personality Deviations.
   2. Behavior Problems in Children.
   3. Home Care Cases.
   4. Suicide.
   5. Alcoholism.
   6. Drug Addiction.
   7. Marital Difficulties.
   8. Family Difficulties.
   9. Work Adjustment Difficulties.

10. Difficulties in Relations with Social Agency.
11. Sex Difficulties.
12. Problems of Delinquency.
13. School Maladjustment.

Most of the classes under B are further subdivided, and all the classes and subclasses are carefully defined, by means of the descriptive terms found in the records, in such a way as to make their use as objective as possible. This secondary classification of psychiatric and social problems performs several functions: it amplifies and differentiates the limited information provided by the reaction type classification, serving especially in the classes "Psychopathic" and "Maladjusted" to present more specific and meaningful characterizations than those terms denote. Likewise, it provides a method of presenting all the known significant facts of each case without the restraint imposed by a system of mutually exclusive classes; it delimits the variable activities and behavior of each individual to what was displayed during the year 1933; and its form is such that it may be transferred directly to tabulating cards for mechanical handling.

In general, this section of the classification is designed to be an approach to the difficult task of describing by statistical methods a group of individuals in terms of their behavior, personality and reaction to their environment and social responsibilities. It is not, in fact, a true system of classification, but rather a limited set of artificially segregated categories which are designed to embrace descriptively all types of human social and behavior difficulties, and which are selected for each individual in whatever combination best describes him.

Treatment of the Data.

The difficulties and even dangers of attempting a statistical analysis of such material are fully recognized. The primary aim is to explore the possibilities of making such an analysis and the detailed results which are to be presented in later papers will represent largely contributions to methodology in the field of mental hygiene statistics. This field has as yet been hardly touched, and it appears that the only profitable line of attack is to investigate all details minutely and to discuss in thoroughgoing fashion both the limita-

tions and the possibilities of a statistical treatment of human personality deviations.

The distribution of the 3796 cases among the reaction types of the primary classification is as follows:

	White.	Negro.	Total.
Psychotic	282	53	335
Post-psychotic	61	6	67
Psychoneurotic	93	19	112
Epileptic	32	10	42
Psychopathic	68	5	73
Maladjusted	1802	1365	3167
Total	2338	1458	3796

The population of the Eastern Health District, as determined by the 1933 census, was for that year 56,044 (43,681 white, 12,363 negro). The total number of cases collected by the study thus comprise 6.77 per cent of the population (5.35 per cent of the whites, 11.79 per cent of the negroes). However, the 3167 cases under "Maladjusted" include 1300 adult delinquents (527 white, 773 negro) who present no other known problems than being arrested by the police on charges representing, in the aggregate, a great variety of offenses. In view of the fact that it has not been found possible to assign these to any other type of problem than adult delinquency, it was decided to treat them as a special group presenting problems whose relations to mental hygiene problems remain for the present undetermined. The remaining 2496 cases represent 4.45 per cent of the population (4.14 per cent of the whites, 5.54 per cent of the negroes).

The information contained on the summarized history cards and the classification in detail were coded, and the data were transferred to tabulating punched cards. As would be expected the nature and large volume of these data created special problems both in the coding and in the set up of the tabulating card. The solution of these problems may very likely be of interest to other investigators in this field and inquiries about the mechanics of the methods used will be welcomed.

A great number of analytical lines of approach are made possible by having at hand the 1933 census of the district. In this the population is described by single years of age, by race, sex, ward and

block, and information about size, composition, crowding and economic status of each household is available. The census, accordingly, provides the indispensable data from which adequately corrected incidence and prevalence rates may be determined, and furnishes facts about the economic and social background of the cases and of the rest of the population as well.

There has been prepared a complete index of the mental hygiene cases arranged by ward and block, from which the mental hygiene situation of any very small section of the district can be readily studied. Such an investigation promises to be of value because the study has in its records a detailed survey of the district, prepared by the Baltimore Criminal Justice Commission, which describes each block in terms of its economic and social attributes and deficiencies.

At present studies of the incidence and prevalence of certain of the more clear cut disorders, the association of various reaction types and problems with population density and economic and social factors, the examination of sources of information, clinic contacts and hospitalizations, and the study of such problems as the family relationships of cases and their association with other disorders, are under way.

THE DIAGNOSTIC VALIDITY OF THE RORSCHACH TEST.*

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The Rorschach test, introduced in 1921 by Hermann Rorschach of Switzerland, has gained general recognition here and abroad as a valuable adjunct to ordinary clinical methods of examination. The degree of validity accorded to it, however, has varied greatly with the individual approach of the investigator. In Switzerland and Germany the method has been studied and applied primarily by clinical psychiatrists, who have convinced themselves and others of its unusual and at times extraordinary capacity for portraying normal and pathological traits of personality. The publications of Rorschach and Oberholzer in particular have demonstrated the possibilities of the test in regard to differential diagnosis and personality study, as well as the great difficulties involved in its application. In this country and in England, on the other hand, although some few psychiatrists (Guirdham, Levy) have interested themselves in the test, the main body of work has been done by psychologists (Beck, Hertz, Vernon and others), who have approached the problem from a somewhat different point of view. While accepting the fact that the Rorschach is able, in a certain number of cases, and in the hands of experts, to tell us a great deal about an individual, they stress the need for more objective and " scientific " methods in administering, scoring and interpreting the test. Hertz [1] and Vernon [2, 3] have made statistical investigations of the reliability of the Rorschach, using the split half method, and arriving at quite different conclusions, Vernon finding the very low average correlation coefficient for the various factors in the test of +0.54, whereas Hertz's coefficients average about +0.80. Accordingly, the latter concludes that the Rorschach is a reliable instrument, while Vernon finds on the contrary that it is entirely unreliable. We cannot discuss in this communication the many

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

difficult problems involved in these and other authors' studies of the reliability and validity of the test, problems which will be considered in detail in a subsequent publication.[4] Here we would merely point out two major fallacies which, although recognized by the writers themselves, are given scant consideration, but which in our opinion invalidate the results of both of the above-mentioned investigations, the favorable as well as the unfavorable. In the first place, the split half method assumes that five of the ten Rorschach cards can be selected in such a way as to make them at all comparable to another five; this is not the case, as any worker experienced in the method can testify. The cards were selected and arranged in their customary sequence by Rorschach for the very reason that each one offers different opportunities for eliciting answers of various types. Secondly, the attempt to correlate individual elements of the test, rather than the test as a whole, ignores the fact that no single factor has any one meaning in itself, but must always be interpreted in its relationship to all the other factors. It is this interdependence of all the elements of the test that enables the Rorschach to portray the *total personality,* in which the various partial "functions" are similarly interwoven, with so much more accuracy and depth than other more exact but less plastic methods. A simple example will illustrate this interdependence. The F+ per cent, *i. e.,* the percentage of well seen form answers as compared to the total number of form answers, varies, if other things are equal, with the intelligence of the individual. Unfortunately, however, other things seldom are equal; this same factor varies with the attitude of the subject toward the test, with the qualitative *type* of intelligence, with normal mood swings, and with all types of psychopathology. The same is true of all the other Rorschach factors which are used in estimating intelligence (W, M, A, O, P, succession, etc.). It follows that the evaluation of intelligence through the Rorschach test can be successful only if other aspects of the personality are considered at the same time. A Rorschach interpretation is not an "automatic" translation of test factors into descriptive verbiage, but rather a process of reasoning from a set of experimental facts to a series of conclusions. The more objectively the original facts are obtained, the more accurate will be the conclusions drawn from them (*cf.* Levy[5]), and it is in this

sense that the present attempts to standardize and objectify the scoring of the individual responses are fully justified.

If, then, the statistical correlation of single test factors is inapplicable to the Rorschach, the question arises as to how the validity of the method may best be demonstrated; for it is clear, as Vernon and others have emphasized, that individual examples, no matter how brilliant, of the capacity of the test to describe personality accurately, do not constitute scientific evidence of its general validity. Rosenzweig [6] and Vernon have suggested a method of validation in which a series of personality sketches based upon Rorschach interpretations is matched blindly with a second series, prepared by other investigators, based on clinical notes and personal observation. Using this method, Vernon obtained a correlation coefficient of 0.833 ± 0315, and states that this constitutes a higher degree of validity than is found in any of the objective personality tests used by the psychologists. Although the last statement may well be construed by the clinical psychiatrist as damning with faint praise, the experiment is of interest, and essentially valid. The fact that the results would vary with the experience and ability of the Rorschach interpreter applies equally to any other reasonable method of validation. Of more importance is the fact that the act of matching the two sets is in itself subjective, and that the difficulty of this act, and with it the correlation coefficient, would vary with the number and comparative homogeneity of the subjects examined. In other words, if the series were sufficiently large, it would be impossible to match all the cases, even though the Rorschach interpretations were uniformly successful. Both clinical examination and the Rorschach test, subtle though the latter may be in comparison with other methods, are crude instruments when measured against the rich variety of human personality, and in all probability several sketches from both series would be enough alike to make accurate matching a matter of chance.

A simpler means of validation is the direct comparison of clinical findings and Rorschach interpretations in an unselected group of cases. This method has the advantage of permitting a separate evaluation of the validity of the test in regard to diagnosis, general personality estimate, intelligence level, and special apti-

tudes. In the present communication only the *diagnostic* validity of the Rorschach is investigated by this means; analogous studies of the other factors mentioned will be presented at a later date. It should again be emphasized, however, that although these factors can be presented and validated separately, they cannot be arrived at separately; in order to make a reliable Rorschach diagnosis it is usually necessary to study the personality of the individual as portrayed by the test.

The material used in this investigation consists of 50 patients seen by one of us in consultation during the past two and a half years, to all of whom the Rorschach test was administered; the interpretations were made by the other writer, with no clinical knowledge of the cases. A much larger number of Rorschach diagnoses (about 150) would be available if it were possible to include hospital and dispensary patients in this study, but they have been excluded for the reason that the majority of them were seen casually, and many examined clinically, by the Rorschach interpreter. Even though in most of these cases the clinical examination followed the Rorschach test, it was felt that their inclusion would lessen the objectivity of the investigation. In 4 of the patients studied (Nos. 47, 48, 49, 50), a definite differential-diagnostic problem was posed. Strictly speaking, these cases do not belong in the series; they are included chiefly to demonstrate the practical diagnostic *value* of the test. The series is entirely unselected, representing all the patients fulfilling the requirements mentioned. One factor which might lessen the objectivity of the study should be discussed. In 34 of the 46 cases included in the validation series proper, the test was administered personally by the interpreter. Although no remarks were exchanged beyond the usual brief instructions and subsequent review of the answers, it was of course possible to receive diagnostic impressions, which may, in turn, have influenced the interpretations. This factor would obviously play a greater rôle in hospitalized psychotic patients than in the comparatively mild psychopathological states constituting the great majority of cases in our series, but nevertheless it is regrettable that external circumstances prevented "blind" interpretations in the whole series. Fortunately, however, we are in a position to discount this factor; the validity of the 12 "blind" interpretations, is, as

will be seen, just as great as in the 34 tests administered by the interpreter. Moreover, in another series,[7] in which 55 medical students were subjected to Rorschachs, with special reference to personality and intelligence level, we have been able to confirm experimentally our previous impression that, if the person giving the test has sufficient experience with it to know what questions to ask and what technical notations to make, the validity of the "blind" Rorschachs is the same as in tests administered by the interpreter. On the other hand, an inadequate administration markedly increases the difficulties of interpretation, and lowers both the quantitative validity and the qualitative value of the test.

The results of the investigation are presented in Table 1 listing the preliminary clinical diagnosis, the Rorschach diagnosis, and the final clinical diagnosis, made in most cases after prolonged observation and follow-up.

A detailed statistical analysis of the results shown in Table 1 would, in our opinion, serve no purpose but that of pseudo-scientific "exactness," since the factor to be measured, namely psychiatric diagnosis, is not, in most cases, a black and white affair which can be labelled true or false, or graded according to the degree of correctness. Only through the actual study of the table will it be possible to arrive at an opinion concerning the validity of the test. For the purpose of orientation, however, we summarize our findings as follows:

Apart from purely terminological differences, the Rorschach and the final clinical diagnosis agree "completely" in 39 of the 46 cases in the validation series proper (84.7 per cent). In 5 cases some disagreement exists either in the relative weight given to various factors present (Nos. 9, 18, 30, 36), or in the minute type diagnosis (No. 46). In one case, (No. 42), diagnosed clinically as a reactive behavior disorder, no diagnosis was made from the Rorschach, but the aggressive behavior of the child was correctly evaluated. In one other case, (No. 29), the test was considered unsatisfactory for diagnostic purposes, although the probable diagnosis given, "psychoneurosis, type undetermined," was correct, if inadequate. Accordingly, if we wish to statisticize, we can evaluate the correlation between Rorschach and clinical diagnosis in this series as somewhere between 84.7 and 97.8 per cent. Of the 12 "blind" Rorschach interpretations Nos. 4, 10, 11, 13, 23,

TABLE 1.

Case No.	Age and sex.	Preliminary clinical diagnosis.	Rorschach diagnosis.	Final diagnosis.
1	29 female	Psychoneurosis, anxiety tension state, with depression.	Psychoneurosis, mixed type, predominantly hysterical, with marked anxiety and secondary depression.	Psychoneurosis, mixed, with anxiety and hysterical features, and depression.
2	41 male	Psychoneurosis, obsessional-compulsive state? Schizophrenic reaction?	Early paranoid schizophrenia, with obsessional-compulsive symptomatology.	Schizophrenic reaction, paranoid type, with psychoneurotic features.
3	43 male	Periodic alcoholism on the basis of a psychoneurosis, anxiety state.	Psychoneurosis, predominantly obsessional-compulsive, with anxiety.	Periodic alcoholism on the basis of a psychoneurosis, with predominant anxiety.
*4	18 male	No diagnosis. Possible homosexual trends.	No marked psychopathology, but some evidence of underlying neurotic mechanisms. Definite immaturity.	No diagnosis, immature personality.
5	17 female	Psychoneurosis, hysteria, with depression and some schizophrenic features.	Very mild and early (latent) schizophrenia with marked hysterical superstructure, and depression.	Early schizophrenic reaction, with many hysterical features, and depression.
6	37 male	Psychoneurosis, anxiety state, with obsessional features.	Psychoneurosis, mixed type, with obsessional-compulsive and anxiety symptoms.	Psychoneurosis, anxiety state, with obsessional features.
7	44 female	Depression.	Depression, probably involutional melancholia, with some hysterical features.	Prolonged depression, possibly involutional melancholia, with psychoneurotic features.

* In the cases marked with an asterisk the test was administered by a third person.

* In the cases marked with an asterisk the test was administered by a third person.

TABLE 1.—CONTINUED.

Case No.	Age and sex.	Preliminary clinical diagnosis.	Rorschach diagnosis.	Final diagnosis.
8	44 female	Psychoneurosis, chronic invalidism, with hypochondriacal trends.	Psychoneurosis, hysteriform hypochondriasis, with depression.	Psychoneurosis, chronic invalidism and hypochondriasis, with depressive features.
9	35 female	Psychoneurosis, anxiety state, with some depression.	Mild endogenous depression in a cyclothymic individual, with pronounced anxiety, probably of a psychoneurotic nature.	Psychoneurosis, anxiety state, in a cyclothymic individual.
*10	45 female	Psychoneurosis, hysteria? Post-traumatic encephalopathy? Malingering?	Psychoneurosis, hysteria.	Psychoneurosis, hysteria.
*11	49 male	Depression. Mental deficiency.	Depression, probably predominantly endoegnous, in an individual of low intelligence.	Depression. Mental deficiency.
12	41 male	Psychoneurosis, anxiety state.	Psychoneurosis, predominantly anxiety, in a schizoid personality.	Psychoneurosis, anxiety state, with schizoid features.
*13	35 female	Autogenous depression.	Endogenous depression.	Autogenous depression.
*14	36 male	Psychoneurosis, mixed type.	Psychoneurosis, mixed type, with marked anxiety.	Psychoneurosis, mixed type.
15	52 female	Psychoneurosis, hypochondriasis.	Psychoneurosis, mixed, with marked hypochondriacal trends.	Psychoneurosis, hypochondriasis.

* In the cases marked with an asterisk the test was administered by a third person.

TABLE 1.—CONTINUED.

Case No.	Age and sex.	Preliminary clinical diagnosis.	Rorschach diagnosis.	Final diagnosis.
16	24 male	Schizophrenic reaction, paranoid type.	Paranoid schizophrenia.	Schizophrenic reaction, paranoid type.
17	37 male	Psychoneurosis, obsessional-compulsive state.	Psychoneurosis, classical obsessional-compulsive state.	Psychoneurosis, obsessional-compulsive state.
18	43 female	Paranoid state.	Depression, with paranoid trends. Not a schizophrenic reaction.	Paranoid state, with depressive features.
19	56 male	Post-traumatic encephalopathy? Post-traumatic psychoneurosis?	Organic reaction, probably cerebral arteriosclerosis, with depression.	Cerebral arteriosclerosis, aggravated by trauma, with some depression.
20	20 male	Psychoneurosis, anxiety state. Possible petit mal epilepsy.	Psychoneurosis, predominantly hysterical, with pronounced anxiety.	Psychoneurosis, anxiety state. No epilepsy.
21	22 female	Early schizophrenic reaction.	Schizophrenia, with hebephrenic and catatonic features.	Schizophrenic reaction, predominantly hebephrenic.
22	25 female	Psychoneurosis, mixed type.	Psychoneurosis. Deep-seated inhibited state, with obsessional features.	Psychoneurosis, mixed type.
*23	44 female	Reactive depression.	Depression, probably reactive.	Reactive depression.
24	34 female	Chronic alcoholism on the basis of a psychoneurosis, anxiety tension state, with depression.	Psychoneurosis, anxiety hysteria, with marked secondary depression.	Chronic alcoholism on the basis of a mixed psychoneurosis, predominantly anxiety with tension, and depression.

* In the cases marked with an asterisk the test was administered by a third person.

TABLE 1.—CONTINUED.

Case No.	Age and sex.	Preliminary clinical diagnosis.	Rorschach diagnosis.	Final diagnosis.
*25	27 female	Psychoneurosis, hysterical reaction.	Psychoneurosis, hysteria.	Psychoneurosis, hysterical reaction.
26	17 female	Acute hypomania.	Hypomania. No schizophrenic features. Underlying hysterical personality.	Acute hypomania.
*27	31 female	Depression? Early schizophrenic reaction? Psychoneurosis?	Psychoneurosis, deep-seated inhibited state with obsessional features and anxiety, and marked depressive trends, probably in part endogenous in nature.	Psychoneurosis, mixed type, with depression.
28	17 male	Early schizophrenic reaction, hebephrenia.	Early schizophrenia, primarily hebephrenic, with catatonic features.	Early schizophrenic reaction, hebephrenia.
29	23 male	Psychoneurosis, mixed type.	No definite diagnosis possible due to extreme paucity of answers. Probably psychoneurosis, type undetermined.	Psychoneurosis, mixed type.
30	27 female	Psychoneurosis, hysterical reaction.	Mild (latent) schizophrenia with pronounced hysterical superstructure.	Psychoneurosis, hysterical reaction, with some schizophrenic features.
31	29 female	Psychoneurosis, mixed type, with depression.	Psychoneurosis, with hysterical and marked obsessional features, and considerable depression.	Psychoneurosis, mixed type, predominantly obsessional-compulsive, with depression.

* In the cases marked with an asterisk the test was administered by a third person.

TABLE 1.—CONTINUED.

Case No.	Age and sex.	Preliminary clinical diagnosis.	Rorschach diagnosis.	Final diagnosis.
*32	58 female	Hypochondriacal depression.	Depression with hypochondriacal trends, probably on the basis of cerebral arteriosclerosis.	Hypochondriacal depression, with organic background of undetermined nature.
33	32 male	Homosexuality.	Psychoneurosis, mixed, with marked anxiety. Probably perverse sexual life.	Psychoneurosis, anxiety state. Overt homosexuality.
34	56 female	Psychoneurosis, anxiety tension, with depression.	Depression, on a psychoneurotic basis.	Psychoneurotic depression.
35	29 male	Drug addiction on the basis of constitutional psychopathic inferiority, with anxiety and tension.	Character disorder, probably neurotically determined, with marked anxiety.	Drug addiction on the basis of constitutional psychopathic inferiority or neurotic character disorder, with anxiety and tension.
*36	27 female	Tension depression.	Schizophrenic depression.	Tension depression, with many schizophrenic features.
*37	25 female	Psychoneurosis, anxiety state.	Psychoneurosis, hysteria with anxiety.	Psychoneurosis, anxiety state.
*38	50 female	Psychoneurosis, hysterical reaction, with depression.	Psychoneurosis, hysteria, with depression.	Psychoneurosis, hysterical reaction, with depression.
39	29 male	Chronic alcoholism on the basis of a chronic anxiety state with hysterical features.	Psychoneurosis, mixed type, with marked anxiety.	Chronic alcoholism on the basis of a chronic anxiety state with hysterical features. Possible underlying C. P. I.

* In the cases marked with an asterisk the test was administered by a third person.

* In the cases marked with an asterisk the test was administered by a third person.

TABLE 1.—CONTINUED.

Case No.	Age and sex.	Preliminary clinical diagnosis.	Rorschach diagnosis.	Final diagnosis.
*40	49 female	Autogenous depression.	Endogenous depression.	Autogenous depression.
41	53 female	Psychoneurosis, hysterical reaction, with hypochondriacal trends.	Psychoneurosis, hysteria.	Psychoneurosis, hysterical reaction, with hypochondriacal trends.
42	8 male	Reactive behavior disorder. Hypomania?	No definite diagnosis. Marked aggression, probable outbursts of temper.	Reactive behavior disorder.
43	25 female	Psychoneurosis, mixed type, predominantly hysterical, with depression.	Psychoneurosis, mixed type, with depression, in a schizoid individual.	Psychoneurosis, mixed type, predominantly hysterical with depression.
44	32 male	Schizophrenic reaction, paranoid type.	Schizophrenia, chiefly paranoid, with some catatonic features.	Schizophrenic reaction, paranoid type.
45	67 female	Senile deterioration with depression.	Endogenous depression. No organic features noted.	Autogenous depression.
46	47 male	Chronic alcoholism on the basis of a psychoneurosis, predominantly an anxiety state. Beginning organic deterioration.	Psychoneurosis, obsessional-compulsive, with pronounced anxiety. There is some evidence of organic involvement.	Chronic alcoholism on the basis of a psychoneurosis, predominantly an anxiety state. Beginning organic deterioration.
†47	46 female	Psychoneurosis, anxiety state? Petit mal epilepsy?	Epilepsy with pronounced hysterical superstructure.	Psychoneurosis, anxiety state, with hysterical features. Possible petit mal epilepsy.

* In the cases marked with an asterisk the test was administered by a third person.
† In theses cases the differential-diagnostic problem was known beforehand to the interpreter of the Rorschach test.

TABLE 1.—CONTINUED.

Case No.	Age and sex.	Preliminary clinical diagnosis.	Rorschach diagnosis.	Final diagnosis.
†48	37 male	Post-traumatic hysteria? Malingering? Post-traumatic encephalopathy?	Psychoneurosis, hysteria, with malingering.	Post-traumatic hysteria with predominant malingering.
†49	42 male	Post-traumatic hysteria? Post-traumatic encephalopathy?	Post-traumatic encephalopathy, with some hysterical features.	Post-traumatic encephalopathy, with some hysterical features.
†50	38 female	Post-traumatic hysteria. Post-traumatic encephalopathy.	Post-traumatic encephalopathy.	Post-traumatic encephalopathy.

† In these cases the differential-diagnostic problem was known beforehand to the interpreter of the Rorschach test.

25, 27, 32, 36, 37, 38, 40), 11 show complete agreement (91.6 per cent); of the four cases in which the Rorschach interpreter was acquainted with the differential-diagnostic problem before giving the test, three show complete agreement, and in the other, (No. 47), the final diagnosis is still open. In this connection it is worthy of note that in 12 of the 39 cases in which Rorschach and final diagnosis coincided exactly, the preliminary diagnoses differed to some extent from the other two. In 5 of these cases (Nos. 4, 7, 12, 32, 33) the Rorschach merely gave some additional information; in 6 (Nos. 2, 5, 10, 19, 20, 27) differential-diagnostic problems were clarified; in 1 (No. 45) the diagnosis was changed. We mention this point not so much to emphasize the practical value of the test, as to bring out a possible objection to the validity of the study. In many instances the clinical examiner had access to the Rorschach results before the final formulation of the case, and it might be argued that the test itself influenced his opinion, since the correlation between Rorschach and final diagnosis is slightly higher than between Rorschach and preliminary diagnosis. In answer to this, we can only state that under no circumstances would a Rorschach interpretation be accepted if it were not clinically verifiable. We do not use the test as a substitute for clinical examinations, but rather as a method to give direction to further and more detailed clinical investigations along certain lines. Moreover, as stated above, the diagnosis was actually changed in only 1 case; if we exclude the 6 cases in which no definite preliminary diagnosis was made, we find correlation between Rorschach and preliminary diagnosis in 80-95 per cent of the cases, varying as before with what we mean by "correlation" in psychiatric diagnosis.

We are interested in the Rorschach test for three reasons: its practical clinical value, its theoretical contributions to the study of the structure and functioning of human personality, and its great potentialities, hitherto scarcely utilized, as an instrument in specific psychiatric research. Whereas the quantitative validity of the test is of no great importance in relation to the first two functions mentioned, it is directly concerned with the last. During the past two years we have been engaged in a series of long term research projects in which the Rorschach test has played an important, although by no means predominant, rôle. The accuracy of some

of the conclusions to be drawn from these studies will be dependent in part upon the validity of the Rorschach, and it is for this reason that we have attempted to demonstrate this validity experimentally.

SUMMARY.

1. Previous attempts to investigate the reliability and validity of the Rorschach test by means of statistical methods are criticized.

2. In a series of 50 cases the Rorschach diagnosis is compared with the clinical diagnosis.

3. The results of the investigation show that the Rorschach test possesses a high degree of diagnostic validity.

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DISCUSSION.

DR. Z. PIOTROWSKI (New York).—The literature on the Rorschach method is rapidly increasing. Unfortunately, however, a large proportion of investigators, outside of Switzerland, use only the Rorschach ink blots and omit the most important part, the interpretation of the results according to principles formulated by Rorschach. The experiment reported by Doctors Benjamin and Ebaugh is of great value as it is the first attempt to validate psychiatric diagnoses, arrived at on the basis of Rorschach blind analyses, in a large number of cases and under rigid conditions of control. The results are very impressive and show clearly that the method yields remarkably valid results if used in the manner in which Rorschach used it. It can be stated, therefore, that the real difficulty is not methodological, for the method is sound, but educational. The trouble lies in its incompetent application by insufficiently trained statisticians. Since isolated aspects of

personality have no meaning if considered separately from the total personality to which they belong, it is, of course, fundamentally wrong to attempt to validate isolated components of the Rorschach record with bits of behavior. This cannot be too strongly emphasized.

The experience which I have had in analyzing records of very different subjects, including, among others, children of pre-school age and adult organic cases, has convinced me that we are quite justified in applying the Rorschach interpretive principles to all records, regardless of the age, sex and mental condition of the subject. One does not need to know the diagnosis of the subject, or his problems, in order to describe his personality adequately. In other words, the method is very satisfactory as far as valid and rather complete description of personality is concerned.

However, the classification of personalities into psychiatric categories—by means of the Rorschach method—is a somewhat different matter. Obviously, a psychiatrist will have little difficulty in diagnosing a patient after he has obtained a good description of the patient's personality. Psychologists are at a disadvantage here. They certainly need the cooperation of psychiatrists if they want to contribute to the solution of psychiatric problems of diagnosis. It must be kept in mind, however, that the validity of the Rorschach method, as an instrument of personality description, does not at all depend upon psychiatric classifications of mental disorders. For, the application of the Rorschach method extends beyond psychopathology.

It would seem that the validation of the Rorschach method as an aid in psychiatric diagnosis can not be so accurate as the validation of the method as an instrument of personality description. It is easier to reach an agreement with respect to description of the patient's behavior than with regard to his diagnosis. Considering this, the high agreement between the Rorschach diagnosis and the final clinical diagnosis as obtained by Doctors Benjamin and Ebaugh is even more noteworthy. I have attempted the easier task of validating Rorschach *descriptions* of personality. Twenty-six subjects, mostly children, whom I have studied so far, were re-examined after a period of a few months (and in some cases after over a year), and the conclusions from each examination were compared with notes made by the medical staff of the New York State Psychiatric Institute or by friends of the subject if he was not a patient. On the whole, the retest showed no serious differences. The differences which were noticeable corresponded closely to differences in the mental attitude of the subject as have been observed in the daily life of the subjects. The most frequent changes pertained to the degree of freedom of self-expression. The subjects became more spontaneous and productive in their inner life, became adjusted to a greater or lesser degree to the environment, or did both. These changes were in part expressed in quantitative terms in so far as they were evident in the psychogram. Although my investigation was not quite the same as that reported here today, it leads to the same general conclusion that the effort put into acquiring the proper use of the Rorschach method is well repaid.

We look forward with interest to the publication of the further studies by Doctors Benjamin and Ebaugh. It would be especially valuable not only to learn of the final conclusions of these studies, but also to be presented with a description of the procedure of analysis, since there is a pressing educational need for such information at the present time.

DR. JOHN D. BENJAMIN (Denver, Colo.).—I appreciate Dr. Piotrowski's remarks, and am in full agreement with his comments.

The question of the validation of Rorschach with personality studies is, of course, in one sense more important than clinical psychiatric diagnosis, but also more obscure. We can validate and compare results of a Rorschach interpretation with personalities on very different levels of understanding. We can estimate from the Rorschach how the person must appear to his friends and relatives, what sort of person he must be clinically. In favorable cases, by no means in all, we can go much deeper than that and investigate drives, the less conscious and unconscious factors at work in personality functioning.

Dr. Piotrowski is one of the group of psychologists who are approaching the Rorschach test probably from the point of view of Rorschach himself, who are not statisticians but are using this method slowly and with certainty to increase our understanding of personality in general and psychopathology in particular.

SOME CLINICAL AND PHYSIOLOGICAL ASPECTS OF THE BRAIN POTENTIALS.* [1]

By JOSEPH HUGHES, M. D., EDWARD A. STRECKER, M. D., AND KENNETH E. APPEL, M. D.

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Studies of the electrical potentials in the cerebral cortex of 80 patients admitted to the Pennsylvania Hospital and of normal subjects have revealed a marked variation in the frequency, pattern and amplitude of those potentials. In those experiments leads were placed on the occiput and the potential changes observed on a cathode ray oscillograph.

Frequencies ranging from 9 to 500 per second have been observed. In normal subjects under emotional stress or in patients who are excited the slow 10 per second alpha frequency gives way to a rhythm of greater frequency; likewise under these conditions the pattern of the potential shows a greater variation. That fear will cause the alpha rhythm to stop has been pointed out by Loomis, Harvey and Hobart.[1] In this work it has been repeatedly observed that the slow alpha rhythm fails to develop during hallucinatory states; likewise it is very frequently absent in patients emotionally disturbed by ideas of guilt, unworthiness or self-accusation.

The disappearance of the slow alpha rhythm in these patients has been ascribed to their disturbed emotional states rather than as a feature resulting from the illness. This viewpoint is in accord with the observations of other workers in this field on the effect of disturbed emotional states on the alpha rhythm.[1-3]

Effect of Sodium Amytal Narcosis.

In a group of manic-depressed patients under sodium amytal narcosis where the predominant rhythm before narcosis varied be-

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[1] Aided by a grant from the Committee for Research in Dementia Præcox, founded by the Supreme Council 33°, Northern Masonic Jurisdiction, U. S. A.

tween 20 and 40 per second, there was a return of the slow alpha rhythm in two of the hypomanic patients for intervals of time during the narcosis therapy. Both of these patients recovered from their hypomania immediately following the narcosis treatment. With their clinical improvement the slow alpha rhythm appeared as a regular feature in their cerebral potentials. The potentials developed in a group of schizophrenic patients under sodium amytal narcosis were not significantly different from those seen prior to the administration of sodium amytal. They were characterized usually by very fast rhythms and showers of activity marked by frequencies as high as 500 per second. In another group, the alpha rhythm reappeared under narcosis. It should be noted that in the schizophrenic patients studied, clinical improvement occurred more frequently in those patients in whom the ten cycle alpha rhythm was seen than among those who showed, as their predominate pattern, potentials of high frequency.

Effect of Changes in CO_2 Tension of the Blood.

Increase in CO_2 content of the blood by means of rebreathing has not resulted in any noteworthy change in the potentials; lowering the CO_2 in the blood by means of over-ventilation has resulted in producing in two subjects on repeated occasions, showers of activity with very high frequencies (300 to 500 per second). This increased activity has been seen most frequently at the beginning of the period of apnea resulting from the over-ventilation. As the CO_2 accumulates in the blood this high frequency rhythm subsides.

Neural Mechanism of the Potentials.

Bioelectric potentials are a phenomenon common to all living tissue. They arise because of differences in concentration of ions. Analysis made by Fenn, Hegnauer and Marsh [4] indicate that the differences in concentration of potassium inside and outside the nerve fiber are chiefly responsible for the potentials observed in a nerve. Sodium, calcium and magnesium play a less important rôle in setting up these potentials. Three factors may contribute to producing these differences in ion concentration; the metabolism of the neurone, chemical changes in its surrounding media, or stimulation of its surface by other nervous activity. Viewed in this

light the cerebral potentials can be considered as the electrical signs of physical and chemical changes taking place in the brain.

Different potential changes have been led off different areas of the brain by Kornmüller and Toennies.[5] These differences have been attributed to variations in the cytoarchitecture of the underlying cortex (Kornmüller[6]). The question of the neural sites for the various rhythms is an open one. Berger[1] believes every part of the cortex contributes to the potentials led off the scalp. Adrian and Matthews[3] hold that the slow alpha rhythm has its origin in the occipital cortex. Jasper and Andrews[7] have pointed out the relationship of the Rolandic area to the fast beta rhythm.

As the result of the experimental findings of ourselves and others[1-8] on the effect of visual and sensory stimuli as well as changed emotional states in abolishing the slow alpha rhythm, we have been led to conclude that one of the physiological requirements for the development of the alpha rhythm is a steady state of excitation in the thalamus in contrast to a fluctuating background of activity in this structure. This view is strengthened from studies on the motor horn cells of the spinal cord[8] which show that the rhythmic activity of these cells is altered as their background of excitation changes. Because of this experimental fact and because the thalamus is the common receptor for visual and sensory stimuli as well as being related to emotional states, we have interpreted the disappearance of the slow alpha rhythm in response to these forms of stimulation as the direct result of these stimuli altering the pattern of the thalamic discharge on the structures responsible for the alpha rhythm.

Some Factors Affecting Neurone Rhythm.

After a neurone discharges, in the process of its recovery from activity, the neurone passes through a state in which any further activity is opposed. This period is known as the subnormal period and is one of the governing factors in determining the rhythm of neurones.[9-10] Application of this concept of the subnormal period to the cerebral potentials permits the following deductions. Groups of similar neurones, such as the "alpha neurones," which discharge synchronously, will recover from their subnormal period at the same time and can redischarge again in unison. As long as the

activity of these neurones is synchronous, a regular rhythm will be maintained. If, however, some neurones discharge sooner than others, because of stimuli coming to them from the thalamus or other structures, the recovery from subnormality will become asynchronous; when this occurs, the regular rhythm will be abolished.

Provided that the strength of stimulus to a neurone is increased, the rate of discharge of the neurone may be likewise increased by allowing activity to occur earlier in the subnormal period.[11] Because of this property of neurones, it is likewise possible to explain such increases in the alpha rhythm of brain potentials as are seen to occur with the flickering light technique of Adrian and Matthews [3] as resulting from a similar mechanism. Underlying the maintenance of continuous rhythmic activity in the central nervous system, are the factors of the spontaneous metabolism of the individual neurones as well as the effect on the cerebral neurones of afferent stimuli or changes in their chemical environment. Lorente de No [12] has recently pointed out that the anatomical arrangement of neurones into closed chain systems also favors the maintenance of continuous activity in the central nervous system. Hughes, McCouch and Stewart [13] have obtained evidence that over-ventilation permits rhythmic potentials to develop in the spinal cord.

Relation of Cerebral Potentials to Potentials in Nerve Fibers.

The sequence of events in the electrical response of a nerve fiber consists of a fast "spike" potential followed by slower negative and positive potentials known as "after-potentials." On histological grounds, since a large part of the cerebral cortex is made up of nerve fibers, it seems reasonable to assume that a large part of the cerebral potentials represents activity in these intracortical fibers. Because of the anatomical structure of the brain, axon potentials similar to those seen in peripheral nerve undoubtedly exist in the cerebral cortex. Indeed, the fastest frequencies seen in the patients studied in this work (500 per second) approaches in their duration the fast "spike" potentials of peripheral nerve; the slower frequencies are comparable to the slow potential changes (after-potentials) seen in peripheral nerve or in the spinal cord.[14]

Discussion.

At the present time there is no evidence relating the cerebral potentials to any known mental phenomena. From a biological standpoint they represent electrical changes occurring because of differences in concentration of ions, chiefly potassium, within the neurones. Physiologically, the brain potentials are related to the potential changes seen in peripheral nerve and in the spinal cord. Their rhythm is determined in part by their own metabolic changes and in part by the background of excitation which plays upon their surface. Clinically, the presence or absence of the slow alpha rhythm is related to the emotional state of a patient. In two hypomanic patients studied in this work, the presence or absence of the alpha rhythm was an index of the patient's condition. Fast frequencies were the rule in the schizophrenic patients who were examined. It must be remembered, however, that similar fast frequencies are met in normal subjects as well as in other psychotic conditions and are not a finding peculiar to schizophrenia.

The cerebral potentials are capable of revealing only those activities of brain cells that have an electrical sign. Any function that does not generate a detectable potential cannot be revealed by any electrical method of examination. Furthermore, since it is not possible to infer a physiological or mental function from an electrical potential, only to the degree in which cerebral potentials are correlated with clinical findings or with chemical or physical changes taking place in nervous tissue, will they be useful in psychiatry.

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DISCUSSION.

DR. DAVID R. CLARK (Detroit, Mich.).—Those of us who deal with clinical medicine sometimes stand alongside of our patient and like to believe that clinical judgment is all important. But I wonder if it is or not. As we stand alongside of our disordered patient, most of us, wonder what in the world is going on in that physiological mechanism, and up to now, and even now, we are to a great extent blocked, frankly because we don't know any great amount of the physiology of this disordered individual.

We are beginning to learn a little something through work like this of cerebral chemistry, of physiological sets in relationships to the disorder thereof, and the mere fact that we cannot use it at the present time in clinic and say, "Here, this disturbance in potential indicates a recoverable or a non-recoverable form of schizophrenia," is not such a disheartening thing as the doctor's summation would seem to lead us to make.

It is a start, and an excellent one. Let us ask the gentlemen of the research division to continue.

DR. EDWARD A. STRECKER (Philadelphia, Pa.).—One would wish that papers of this sort would be discussed at a kind of round-table conference in which there could be an exchange of opinion with informality, and with thought and with frequent trips back to the laboratory.

The study of brain potentials is, of course, very much in its experimental stages. In these modern and somewhat degenerate days, there is, of course, always the urge and almost the imperative demand from the clinical side of psychiatry whose needs, after all, are very great, to find in the work some immediate clinical application.

I trust that scientific work of this kind will resist with a stony heart any attempt to satisfy at this time any such clinical urges and requests. After all, we learn from this piece of work: That there is to begin with no definite brain pattern or graph which could in any way be utilized to sort out different types of psychoses.

I might add, it is a good thing that there is not any definite way at the present time, because any application too soon of the somewhat fascinating and potentially valuable things that come from studies of this kind would in a certain measure destroy its usefulness.

At most, one might say there are interesting speculations that one might make. Perhaps the important one from this particular piece of work is that when the psychotic patient, be he manic-depressive or schizophrenic, shows

clinical improvement there seems to be a tendency—and one must be careful to say no more than that—in those patients for the brain potential to return to the normal or alpha form.

If more work and much more work along these lines should indicate that that would be true and valid, then it would constitute a contribution of some clinical importance.

DR. HERBERT JASPER (Providence R. I.).—I have been glad to hear this report of Dr. Hughes, and especially of the caution that he, Dr. Strecker and Dr. Appel have taken in the interpretation of their findings with the psychoses. It is certainly encouraging, although we could expect it from these men. It has not been taken by all men in the field.

We have been working at Providence on similar problems for the past two years, and perhaps a few of our results might be of interest in corroboration, and actually giving an interesting confirmation of your findings.

In a group of sixty-odd schizophrenic patients selected out of a group of about twelve hundred of various types of schizophrenia, selected on the basis of their clear, extreme forms, we have found that as Dr. Hughes has indicated, if there is anything that will characterize them, it is this flat record with high frequency potentials rather than the slow alpha rhythm, although many exceptions, of course, are found to this with schizophrenics, even apparently with similar clinical pictures.

We have also performed the experiment that Dr. Hughes did with sodium amytal, and we found also that in schizophrenic stupor, where we have a flat picture, high frequency, low amplitude potentials, the schizophrenic patient will come out of the stupor under the narcosis at the same time as the alpha waves return.

We have repeated that several times, and in those patients who are affected by sodium amytal we find the change in the brain wave as Dr. Hughes has indicated. However, we did the same experiment on a normal person who gave the schizophrenic brain wave picture.

We have in our laboratory a colleague who persists in having a brain potential record just like our worst schizophrenics as indicated by absence of alpha waves, flat pictures and high frequency potentials. We thought we would try amytal on this individual to see what the effects would be, and the amytal affected the brain waves in precisely the same way as it did the schizophrenic patients, bringing the flat line slowly down to a ten-cycle alpha rhythm.

The interesting thing was, from the point of view of the physiological substrative mental activity, at the time the most beautiful regular alpha rhythm was appearing which we see in normal people under waking, relaxed conditions, our subject was unconscious under the amytal, so that the whole correlation, apparently, even of consciousness with this brain rhythm, is not clear. Because you can have what seems to be a normal alpha rhythm in a person who is completely out with amytal, and in a normal state will give a schizophrenic-looking, blocked picture, it is a complicated problem for interpretation.

We had a number of other findings which corroborated to a great extent the findings in the relation between the cortical potentials and the cord and nerve potentials. There is only one thing in which we might differ with Dr. Hughes, Dr. Strecker and Dr. Appel, and that is the interpretation of these fast waves. So far, we have been calling those muscle potentials. I have never seen in the records directly from the cortex with electrodes on the surface under good, normal conditions, any of these potentials which appeared clearly at high frequencies, except under very unusual conditions.

From the surface of the head, muscle potentials are so easily picked up, and in patients so frequently you can know that they are muscles. We would hesitate to say that any of these pictures that were shown of high frequencies were actually high frequency cortical activity, although we are certainly open to suggestion.

I will add that in some schizophrenics when we could find no muscle tension at all when palpating, we got this high frequency rhythm and thought maybe some of the muscles were not contracting, but I think that is a good point.

Dr. Joseph Hughes.—I want to thank the discussors of the paper, and in closing I want to ask Dr. Jasper if a possible reason for his not seeing potentials of fast frequency in the cortex, is the fact that the anesthesia employed in his experiments might have suppressed them. I know that in the instance of the spinal cord of a cat the potential picture of the cord changes after the ether is blown off so that after three or four hours, without anesthesia, potentials of fast frequency appear.

POST-OPERATIVE PSYCHOSES.*

By MILTON M. ABELES, M. D., New York City.

The post-operative psychosis presents a syndrome which is complicated by many factors. The operation itself is only one factor in a series of events leading to the psychosis. It is probably a very important factor and functions chiefly as a precipitating agent in the breakdown of the patient. The many other factors involved in this entity are the previous personality of the patient, the pre-operative conditions and emotional state, the anesthesia, and the many other organic features. These other organic features may be resultant endocrine upsets, changes in the chemistry of the organism, the presence of vascular disease and nutritional disturbances. The post-operative psychosis also raises many psychological problems due to fears of mutilation.

A series of 23 cases of post-operative psychosis were studied at Bellevue Hospital. The ages of the patients varied from 17 years to 73 years. According to decades there was one in the second decade, six in the third decade, five in the fourth decade, eight in the fifth decade, two in the sixth decade, and one in the eighth decade. Obviously, the vast majority (over 80 per cent) are in the third, fourth and fifth decades. This fact has no significance except that it is a reflection of the age groups which are most frequently subjected to operations.

As to distribution according to sex, fourteen were females and nine were males.

As to the type of operation, five followed operations involving the ovary and uterus, there were four each following operations for hernia, thyroid disease, and gastro-intestinal conditions including appendicitis. There was one each of the following operations: hemorrhoidectomy, arthrotomy, drainage of a pilonidal abscess, umbilical herniorrhaphy, enucleation of the eye and cholecystectomy.

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

From The Psychiatric Division of Bellevue Hospital, New York, N. Y.

Here again it is important to point out the large percentage of cases following the operations on the thyroid and genital organs.

As to the types of anesthesia used there were 20 cases in which the anesthesia was known.* Seven were done under spinal; gas anesthesia (ether, nitrous oxide, ethylene, etc.) was used in nine more; two depended on avertin; and finally two were done under local anesthesia.

Concerning the time of onset of the psychosis this varied from immediately post-operative to 15 days. Six cases followed immediately, one appeared on the first day, two on the third day, four on the fourth day, one on the fifth day, one on the sixth, three on the seventh, and one each on the eighth, ninth, twelfth, fourteenth and fifteenth days. The outstanding feature here is the presence in a large majority of the cases of an interval of 1 to 15 days before the onset of the psychosis. This led Kleist [1] to name the condition "Interval Psychosis." Many other observers have noted this period of latency following the operation. Doyle [2] considered it a result of absorption of the products of the operative procedure. It is of especial interest that in a considerable percentage the mental symptoms became manifest from the third to the fifth day (30 per cent). It is possible that here the absorption of protein products from the operative site may produce some state equivalent to protein shock. The work of Bürger and Grauhan [3] seems to have an especial significance here. In their studies on the disturbances in the protein metabolism and their influence on the post-operative course, they found a number of important phenomena. It was noted, for instance, that there was a 200 per cent increase in the nitrogen excretion over the pre-operative period. The highest occurred two or three days after the operation. They also found, however, that the anti-trypsin titer increased and was highest on the fourth to fifth days. Evidently trypsin is produced at the operative incision in order to break down and help in the assimilation of protein products. Apparently the highest point in the destruction of proteins occurs about the third day following operation and this is when a large percentage of the post-operative psychoses begins. Other observers (Doyle and Waltman [4]) have also noted the interval. The psychosis may be present in a latent,

* In most instances the operations were performed in other hospitals and complete details were not always available.

subclinical state even before operation, however. This will be discussed later (*vid. infra*).

Concerning the symptomatology most observers agree that they fall more or less into the same syndrome as the toxic-exhaustive and infective states. There is a combination of confusion, delusions, hallucinations, and disturbances in motility. Kleist describes a picture such as the above in the foreground. Doyle describes the symptoms in his cases as similar in all. All were confused and delirious, there were disturbances in motility, a large percentage had hallucinations and delusions. He classified the cases as deliria. Waltman in his group described restlessness, irritability, apprehension, agitation, euphoria, depression, hallucinations and delusions.

In this present series 17 showed confusion at some time during the psychosis. This confusion was manifested by disorientation, inability to handle memory material, and bewilderment. Sixteen cases had either auditory or visual hallucinations. In one case there was a question of olfactory hallucinations. Auditory hallucinations predominated. Most outstanding was the unusual number of cases with paranoid delusions. Twenty of the 23 cases had persecutory ideas at some time during the psychotic episode. Two patients had grandiose delusions. More than half the patients showed excitement and restlessness in the course of their illness. Five patients had definite suicidal tendencies making actual overt attempts. Other emotional and motility disturbances were evidenced by depression, apprehension, agitation and irritability.

The duration of the psychosis is extremely variable. Kleist divides his cases into those of short duration which lasted from a half to 14 days and those of longer duration lasting 4 to 11 weeks. Doyle's cases varied from 2 to 60 days and averaged about 13 days. Other observers have reported cases lasting as long as four or five years. When the duration becomes exceedingly long as these are, then the suspicion that a schizophrenic process or an organic psychosis may be present is very strong. Twelve days was the shortest duration of any case in this present series. Two years was the longest duration of a case in this series. Here the probability is that the patient has gone on to a schizophrenic process.

It is important now to consider some of the problems which arise from such a complicated combination of circumstances as

are the post-operative psychoses. It is extremely essential as McGraw,[5] Washburn and Carns,[6] and others have pointed out that the individual has to be considered as to family history, his intellectual level, his pre-psychotic personality, his previous operative history, his previous hospital experience and his instinctive reactions. It must be remembered that the psychosis in any individual is just a continuation of his entire life history including all his previous experience. As Wolfe and Curran [7] have pointed out the content of the " dysergasic " state is dependent on the subject's equipment and experience. Therefore no matter what the type of operation, anesthesia or operative setting and other external agents exist, there will be the same distinctive personal characteristics in each patient dependent on that individual's habits of reaction, dominant interests, and past experiences. In addition to the patient's background and personality the actual pre-operative setting with all the accompanying fear of operation is almost invariably present to some degree. This may be so intense that it may precipitate a pre-operative psychosis. This is particularly well demonstrated in the following case:

A man of 32, a World War veteran, entered the hospital and was prepared for an appendectomy. Soon after preparations had been made including shaving of the pubic region he developed a rather acute hallucinatory episode. The content of his psychosis was a repetition of his war experience. He had been gassed in the war. On the ward he began having visual and auditory hallucinations. He thought he was being shot at by machine guns and that he was in the war. He became excited and apprehensive and hid under the bed. Operation was postponed and he recovered from this hallucinatory episode.

This case indicates that the post-operative psychosis may actually have a latent pre-operative beginning. Undoubtedly the fear and apprehension preceding an operation indicates that tensions are already being built up and that the operation may be merely a precipitating factor. Then the operation is just one incident, the high point, in the course of the post-operative psychosis.

In another case the fear of operation precipitated what apparently was a latent schizophrenia.

This patient, while awaiting operation for an inguinal hernia became excited and developed paranoid delusions. The previous

history revealed that he had anticipated the operation with a good deal of apprehension, and a definite schizophrenic picture has continued up to the present time. Here again the fear of operation was merely a high point and precipitating cause in the development of this individual's psychosis.

Another case in point is one in which the fear of operation was continued in the content of the productions of the psychosis which followed. This patient was continually restless, agitated and apprehensive. She stated she had a feeling that she was continually under ether, that she had been operated on three times and had been dead and resurrected. Here it seems as though the psychosis was a continuation of the fright situation of the operation.

Unquestionably the apprehension and fear of operation and possibly death play an important part in the post-operative psychosis. The strangeness of the setting, the sights and sounds in the operating room, and all the other ceremonies including anesthesia with the fear of losing consciousness that are part of the pre-operative preparations do not help to prevent emotional reactions. Eastman and Kilman [8] feel that the changed strange environment is particularly important in elderly people. Finally it may be said that actually a post-operative psychosis is not only post-operative but actually pre-operative. It is only in the post-operative period that the symptoms become clinically manifest. Of course there are other factors which play a part in placing the psychosis in the post-operative period. These are the organic factors which will be discussed in more detail later. They prepare the soil on which the post-operative psychosis may develop.

The next important problem that is to be considered in the post-operative syndrome is that arising from the deeper fears of castration, mutilation and dismemberment. The psychoanalytic school feels that the fundamental basis in the fear of operation is actually fear of castration, (Schilder [9]). The patient's fear of mutilation or loss of a part of his body is very intense and apparently is frequently expressed in ideas of castration. These ideas came very close to the surface and manifested themselves in the productions of a number of patients.

One patient following a repair of an umbilical hernia developed a psychosis. She said that she was a lesbian and a fairy and felt she was being turned into a man. She felt that she was rotting

away inside. She said: "I thought my uterus and ovaries were gone, I felt I was an indeterminate sexual person. I thought that the two sexes met in one."

Another patient following an inguinal herniorrhaphy developed a psychosis in which he believed there was a vibrating machine sticking needles into him. He thought he was being sterilized and that he was going to be a homosexual. He said: "I was gradually being turned into a fairy."

In addition to the fears of mutilation, fears of death also play an extremely important part. These ideas, of course, are much closer to consciousness. It is interesting that in a number of cases suicidal ideas were prominent. In one case, following an operation for an acute appendix, a man developed an acute psychosis three days later. He was extremely depressed and wanted to die and made a suicidal attempt by slashing his neck and wrists. He continued depressed throughout his entire psychosis.

It is interesting that suicidal trends should be present in a syndrome which probably to a great extent is precipitated by fears of death from the operation.

The excitement accompanying post-operative states has been especially emphasized by Muncie.[10] He feels that to some extent the excitement following operations is an attempt of the patient, as a result of the extreme fear of death, to impress on the persons in his environment the fact that he is still alive. A large percentage of the patients in this series showed extreme degrees of excitement. This symptom is an important and characteristic feature of most of the cases.

The following case was characterized by an extreme degree of excitement. The patient was a boy of 17 who had ulcerative colitis for some time. In addition he had an incapacitating infectious chronic polyarthritis. He was very emaciated and anemic. He was operated and an obstructive ileosigmoidostomy and a colostomy of the right half of the colon was done. He was extremely fearful of the operation. Immediately following it he became psychotic. He talked very rapidly in a flighty stream. He said: "I've been killed, I've been kidnapped, I'm Charles Lindbergh, Hauptmann killed me. Bang, I killed the doctor." He was moderately confused and disoriented. He said: "I don't know where I am. I'm in church. Is this a morgue? This is 1935. Year,

1004. The year one. I'm Christ. I was born just now." He was mentally overactive and his stream of thought was continually disrupted. He continued excited, singing at times, shouting and restless. He had been extremely fearful of the operation. He said: " I was afraid of the operation. I thought I'd die. I did die." With this extreme fear of death, the fact that he had come through alive symbolized rebirth. He was now big and strong. He said: " I'm a movie actor, I did a man's job, I'm a doctor, I'll be big and strong." This also compensated for his long standing sense of his physical inferiority.

Another patient who had been operated on for hyperthyroidism believed she was dead. She would crouch in bed so that she would not be seen dead. She developed ideas of suicide. Here the fear of being discovered dead seemed to dominate this patient's anxiety so that she wanted no one to see her. In this case the mechanism which Muncie described is reversed. Instead of being overactive in order to impress everyone with the fact that she was still alive she hid and became underactive in order to avoid being discovered dead.

The importance of the organ involved in the operation in relation to the productions of the patient has been emphasized many times. The severity or mildness of the operation does not necessarily have anything to do with the likelihood of a psychosis supervening. Mauclaire [11] emphasizes the unusual number of psychoses following gynecological and testicular operations. Brown [12] quoting Rohe again emphasizes this fact. Out of 196 cases Rohe reported 65 following genital operations and 35 in cataract operations. McCarthy [13] reports operations on sexual organs followed by transient mental upsets. It is obvious that the importance to the patient of the particular organ operated will affect the possibility of a post-operative psychosis occurring. It will also influence the character and content of the patient's ideas. The organ involved does not necessarily have to be a genital one. The eyes frequently may take the place of and symbolize the gonads. Psychoses have been noted repeatedly following eye operations. The eye as an organ is not only important as to its symbolic value but also because of its extreme importance in the perception by the organism of its environment. Loss of vision is a tremendous blow to the security

of the individual and necessarily will result in great anxiety. The following case is important in the light of these facts.

A lady of 58 was operated and her eye enucleated. She developed an iridocyclitis in the other. She was then blind in both eyes and subsequently became psychotic. She was very apprehensive but was otherwise clear and oriented. She stated that she saw millions of people,—an army of people surrounding her. "They were just standing, waiting, and put their hands out to grab me." She saw soldiers in uniforms. On one side they were white and the other black. Some had peculiar hats on. They would raise their hands in salute. She said: "I saw green trees and a bridge." She gradually recovered completely from her psychosis and was discharged. It is interesting that the visual hallucination played the outstanding rôle in a patient who became blind following operation.

The next agent in post-operative psychosis to be considered is the part played by the various organic factors involved. These are many and have been emphasized by the various reports. One of the most important factors is the anesthesia. Doyle [14] divides the post-operative psychoses into two groups; the post-anesthetic, and the post-operative. In the former group he places those psychoses which follow immediately and usually are characterized by a delirium which lasts for a day or less after the operation. In the second group he places the so-called interval psychoses. In relation to this it is interesting to describe the following case.

This patient was operated for inguinal hernia and nitrous oxide was used as the anesthetic. On the first day post-operatively he developed a psychosis characterized by confusion and excitement. It appeared to be a typical delirium with hallucinations of a vivid type, violent excitement and confusion. When he had recovered a history was obtained of a similar experience seven years previously when he was given nitrous oxide in a dentist's office for a tooth extraction. At that time he also became violently excited, had vivid auditory hallucinations and confusion. Evidently here was a definite idiosyncrasy to the anesthetic which manifested itself by delirious episodes. Brown also emphasizes the importance of anesthesia in the production of a psychosis immediately following the operation. He states that recovery appears as the anesthesia wears off. However he states that mental symptoms have been noted to follow operations where no anesthesia was used. Walt-

man feels that the fear of loss of consciousness may be a factor. However it may be a result of the intoxication due to the anesthetic. Besides general anesthesia, spinal anesthesia is known to cause neurologic as well as psychiatric complications. Brock, Bell and Davison [15] report a number of such cases. One of their cases developed a picture of encephalitis with coma and confusion. The following is a case in which a confusional syndrome followed spinal anesthesia.

This patient, a 37-year-old clerk, following an appendectomy done under a spinal anesthesia became delirious. He developed auditory hallucinations and felt that he was going to be electrocuted. In his behavior he was extremely disinterested and slow. He answered hesitantly and had difficulty in recall. His delusional ideas seemed to be a result of difficulty in interpreting and differentiating more complicated external situations. He said: "My wife was going to electrocute me. She went out to get bulbs and put them in the socket. That's how I came to think of it." He was emotionally depressed and listless, his memory showed defects.

Although there was a complicating factor of a history of influenza a week before operation this patient appeared to have a confusional syndrome which persisted following an operation with spinal anesthesia. This may have been an organic psychosis, secondary to the effects of the anesthetic ascending to the brain.

The next factor which probably plays an important part is the chemical or metabolic factor. Various observers have noted many different post-operative changes in the metabolism. Among them are the very frequent acidosis, the occasional alkalosis (following gastric operations) acetonuria, glycosuria, and hypoglycemia. Other observers have noted states of hepatic and renal insufficiency (Voltman [16]). It is well known that these various conditions in themselves may alter the mental state. Gardener [17] noted that the alkali reserve falls in post-operative cases. This he states is also true in toxic-exhaustive and infective states. He feels therefore that measures should be taken to counteract the acidosis. McCarthy [13] also considers kidney insufficiency as a cause of acute manic attacks. Without going into any further mechanisms it is obvious that with the metabolic upheaval following operation the chemistry of the organism suffers and probably runs parallel with the mental state of the patient.

The next important factor in the development of a psychosis is the presence of infection and temperature. Often there is no rise in temperature with the true post-operative psychosis. The febrile delirium according to Waltman should be classified separately from the post-operative psychosis. Some patients go through a post-operative psychosis and develop temperature afterwards without a psychosis appearing. The following is a case in point.

A 27-year-old gardener was operated under spinal anesthesia, in order to perform a knee joint arthrotomy. Four days post-operatively the patient began to have paranoid delusions and became clouded. He was very restless and demanded his clothes to go home. He would remove his surgical dressings. He became depressed, anxious, apprehensive and suspicious. He was disoriented in all spheres. He maintained a rather stiff, reserved attitude, spoke very little and became apathetic. He gradually improved and two weeks after the onset of his psychosis he developed a rise in temperature. This rise lasted for two weeks and gradually subsided. During the febrile period he showed no evidence of any psychotic behavior or ideas.

In this case after the disappearance of the mental symptoms the patient developed a temperature without a recurrence of the mental picture.

Another important organic factor which must be considered in many cases is the presence of vascular disease. Frequently individuals with vascular disease due to arteriosclerosis or syphilis may be precipitated into a chronic psychosis by an operation. Cokkinis [18] described the sudden onset of an acute confusional psychosis in a woman of 60 which continued as a chronic paranoid state with confusion. Other more acute vascular conditions may be precipitated by operative procedures. Green and Moore [19] report a post-operative meningeal hemorrhage. Other observers have reported cerebral hemorrhage and thrombosis. It is probable that the severe disturbances accompanying operative procedures may precipitate metabolic and vascular changes in predisposed individuals which may continue chronically.

In the following case this factor probably played an important part. This patient was a man of 59 with evidences of generalized arteriosclerosis. A first and second stage Lahey operation for resection of a rectal carcinoma was performed. Two weeks after

the second operation the patient became disoriented and increasingly violent. He evidently was in delirium. He spoke incoherently and irrelevantly. He would repeat: "Mama, Mama" continually. He was profoundly confused. He improved gradually, but continued to be talkative, excited and apprehensive. He had some persecutory delusions. He had frequent periods of excitement and confusion, especially at night. He continued this way for three months when he became excited again and died soon afterwards. Here evidently a chronic psychosis was precipitated by an operative procedure. This was probably on the basis of an underlying arteriosclerosis.

Waltman feels that the possibility of a food and vitamin deficiency may be instrumental in the development of an acute or chronic syndrome in post-operative cases and suggests the use of liver extract, vitamin therapy, and forced feedings in the treatment. He describes Korsakoff features in his cases as evidence of deficiency factors. In the present series of cases there was no evidence of any deficiency factors involved.

Waltman suggests that the use of sedatives in addition to the anesthesia may also be a factor in the formation of mental pictures following the operation. Finally another important factor is the endocrine disturbance which is associated with operative procedures. Plummer and Mayo [20] and Emmert [21] describe cases of exophthalmic goitre precipitated by operative procedures on organs elsewhere in the body. However in some of their cases infectious processes were also present. Nevertheless, where such glands as the thyroid or the gonads are excised the possibility of an upset in the endocrine balance may have some bearing on the formation of a psychosis. This is especially true in hyperthyroid conditions. The existence of hyperthyroidism itself sensitizes the individual to any external stimuli and from the beginning this type of patient is more likely to over-react to any strain than the ordinary patient. In addition the hyperthyroidism alone may cause a psychosis. Dunlap and Moersch [22] describe three types of hyperthyroid psychosis, first, the toxic-exhaustive psychosis, secondly, the acute delirium, and finally, the manic-depressive reaction. It is the opinion of Dunlap and Moersch that surgical intervention is contraindicated in the presence of mental disturbances. They describe cases of acute hyperthyroid reaction within 48 hours of operation

which lasts four to five days. They find that it is rare to have post-operative reactions after the fourth day post-operatively. If it does occur then the psychosis is apt to last longer. In three of our thyroidectomies the onset was three and four days after the operation. In all of them the psychosis lasted for long periods of time up to several months and in one case the patient did not recover completely until a year later.

It is obvious from the above constellation of organic factors that the patient in going through an operation is subjected to very serious and varied trauma. It is surprising that so many patients endure the upheaval without more frequent mental upsets.

It is pertinent to mention now two cases which show that no one factor, psychological or organic, is important. Both patients had more than one operation at widely separated intervals without similar post-operative experiences. One patient had had a two stage operation for a rectal carcinoma. The first stage which involved a laparotomy with the formation of a colostomy was followed by no symptoms. The second stage a month later in which the rectum was resected was followed in two weeks by a psychosis. In another case a patient was subjected to a thyroidectomy and three days after developed a psychosis which lasted a year from which she completely recovered. Two years following the first operation she was subjected to a radical mastectomy and suffered no psychotic consequences. These two cases serve to indicate that it is not necessarily the personality alone which is responsible for the possibility of a psychosis. Of course the above examples are complicated by the fact that in the second case the first and second operations were not on the same organ. Unquestionably, however, the various organic factors and the pre-operative circumstances play an important part in the etiology of post-operative psychoses.

It is important finally to mention briefly the importance of the pre-operative care of the patient. This has been repeatedly emphasized by many other workers in the subject. The eagerness of the surgeon to subject patients to operative procedures without concern for the patient's instinctive emotional responses is inadequate pre-operative preparation. As much as possible the fears of the patient should be allayed and as simple an enviroment as possible should be prepared for a patient about to be operated. The patient's personality should be considered in the light of his pos-

sible development of a psychosis and operations should be avoided or postponed accordingly. The patient must be informed as intelligently as possible exactly what is going to take place in the operation. The actual procedure is no more gruesome and probably less so than what the patient imagines will happen.

Summary and Conclusions.

No one factor is responsible for the post-operative psychosis. It is evident from our studies that actually in many cases the germ of the post-operative psychosis begins pre-operatively, the operation precipitating and causing the psychosis to become clinically manifest. This has been particularly emphasized by those cases of pre-operative psychosis. The next important factors are the fears of mutilation and death.

Finally organic factors such as vascular disease, infection, endocrine upsets, nutritional disturbances, the type of anesthesia, chemical factors and the use of sedatives are obviously instrumental in the formation of the psychosis. The possibility of protein shock from the absorption of proteins from the operative site must be again noted. The clinical syndrome is characterized by the outstanding mutilation and death fears, confusion which is frequently deep, hallucinations, delusions and excitement.

The combination of the organic factors carrying on a psychosis precipitated by pre-operative fears in an individual with deeper fears of mutilation and perhaps castration briefly summarizes the entire problem of the post-operative psychosis. Of course, whenever so many different factors are invoked as the possible cause of a condition there is always a suspicion that the true cause has not yet been discovered.

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DISCUSSION.

Dr. Joseph L. Gilbert (Washington, D. C.): Mr. Chairman, the doctor has presented an interesting group of cases that have helped to show some of the important factors in the occurrence of a disorder that may follow an operative procedure.

I have no criticism, no critical discussion of the doctor's paper. I only want to add that the psychosis which may appear following an operation may be one of several types. The thing that would concern me chiefly in selecting a patient would be the type of person, what his reactions have been previous to the onset of this illness, how he has withstood these assaults of various kinds, and what, if any, untoward effect this procedure might have on the outcome of the operation in question.

We know certain types of people withstand operations rather badly. What I would want to be sure of in selecting a person for operation would be that the person was not suffering from a psychosis previous to the intended operation I had in mind which was to bring about improvement of this individual's health.

I have had the experience of seeing several persons who were suffering from psychoses, operated on and whose symptoms were the result of a psychosis rather than an organic disease.

So in addition to knowing what type of person and how this person has reacted to the assaults of one sort or another, there are other factors that should be taken into consideration. We know that persons who are chronically addicted to alcohol develop psychoses very readily after the trauma of an operation.

We know that certain fundamentally unstable individuals that we have labeled as "constitutional psychopaths," also withstand surgical procedures rather badly.

I would also wish to know what, if any, other physical disorders the individual was suffering from, especially, cardio-vascular, renal diseases, and so on.

The brief psychosis that is due, perhaps, more to toxic than organic factors following an operation, clears up readily provided the physical condition of the person will permit that individual to withstand the surgical procedure. I feel that the surgical procedure should be postponed or given up entirely where it, after due consideration, may be the greater of the two evils.

I do not have the opportunity to see many of the so-called operative psychoses. The few that I do see are brief in duration, and recover; others, as is well known, go on to the more or less chronic types of psychoses, and in those cases I have my suspicion that there was a psychosis existing previous to the operative procedure.

I am afraid the doctor has been somewhat too brief in his summation of all of the factors that have to do with the precipitation of this psychosis. That is the only essential criticism that I could make, but I think that his study of this group of cases has been worthwhile, and I have enjoyed hearing it very much.

DR. GEORGE J. WRIGHT (Pittsburgh, Pa.): My work in neuropsychiatry may be considered to be largely that of a physician in the front line of work, because I have connections with three of our largest hospitals and also have an acute service in the Psychopathic Department of the St. Francis Hospital where acute cases, coming from the Home or other hospitals, average about

400 a year, so that I feel I am in a position, as far as this particular type of psychosis is concerned, to have some perspective about it.

I believe that it is relatively an uncommon situation now—whatever it has been earlier. In the St. Francis Hospital Service it is unusual to admit a case which can properly be considered a post-operative psychosis.

The mental symptoms of what I would consider a true post-operative psychosis follow pretty much a definite pattern, with confusion and delusions and hallucinations and the motor activity which has been mentioned.

It is not often that we are troubled by the confusions which occur in other states, especially with schizophrenic phenomena which is common in my experience in the post-puerperal psychosis.

Furthermore, there is not the confusion that is so perplexing in the post-traumatic psychosis. The pattern of disturbance, as a rule is pretty definitely established and rather simple.

I agree fully with the method of study as outlined by Dr. Abeles, and his statements about the pre-operative and post-operative factors, but I doubt seriously whether the cases which showed mental symptoms before operation can properly be classified in the post-operative psychosis group as I understand it.

As Dr. Gilbert has indicated, I would be suspicious that there were other mechanisms rather than those associated with the operation itself at work, and that perhaps this particular type of case should be classified differently.

In spite of the emphasis laid upon the psychologic and psychogenic factors, I am more impressed with the physical and toxic factors which seem to be a part of the psychosis, and are often associated with complications due to the injudicious use of drugs and failure to pay attention to the proper diet, and above all, to maintain a proper water balance.

I have had, as has been mentioned by Dr. Abeles, some curious experiences with eye operations. I can remember three cases in which, from a simple cataract operation, a prolonged psychosis developed; and, on the other hand, in reverse order, I can remember two cases in which psychoses were associated with a cataract that recovered after a successful operation.

The course of the psychosis is extremely variable. I do not know whether those cases that last two or three days should be classified as post-operative psychoses. I would rather look upon them as temporary confusional states, due to temporary causes.

But the real post-operative psychosis, in my opinion, runs a variable course and may be from a few weeks up to many months. The longest case I can recall was 12 months, and in this instance there was a definite background of cardio-renal disease.

There is a curious tendency to an average of about six weeks if there are no complicated factors which would keep up the element of toxicity.

I believe that a lot depends upon treatment as to the time of recovery, and I am accustomed to pay particular attention to the kind of sedatives used, and these must be used at times. I am getting more and more away from the

barbiturates and bromides, and I am less and less afraid of the judicious and moderate use of morphine when needed.

Furthermore, the question of food with its vitamin content is of great value, and above all, the maintenance of proper elimination throughout the control of the water balance.

DR. LOUIS J. DOSHAY (New York, N. Y.): I would like to ask Dr. Abeles, if there is any relationship between the first two days of the delirium that you find in the postpartum cases analogous to what you find in the post-operative cases; whether it is on the strain phase or whether it is on the basis of anticipation in these pregnant women; if he thinks it is due to the anticipatory feeling of birth just as in the anticipation of an operation; whether he feels treatment would have any benefit in preparing these women.

DR. DAVID R. CLARK (Detroit, Mich.): I would like to bring a contribution from a big town psychopathic ward. In our community we have the difficulty of repeated admissions to psychopathic wards from the surgical service, sometimes from the clinical observation service, of an individual who has become uncontrollable and perhaps noisy, who is diagnosed as psychotic, and is transferred to "Psycho."

It seems that since the institution of routine orders, both pre-operative and post-operative, we have had to deal with quite a number of incapacitated individuals coming into the ward. The diagnosis perhaps should not be psychosis; it should be toxic delirium. A few measures should be taken against dehydration and for the withdrawal of toxins.

I think possibly the psychopathic service could help a little bit on their own staff as to judgment, as to the advisability of routine orders, both pre-operative and post-operative.

DR. MILTON M. ABELES: Dr. Wright, as far as the pre-operative psychosis that I described is concerned, it was not included in the series of 23 cases but it was included as an example of what might happen before operation and what tensions are really present.

Dr. Doshay, I think that every pregnant woman should be instructed—especially a primipara—about possibilities, and that her fears should be allayed as much as possible. The post partum psychosis is an entity in itself which I think should be handled separately.

RESULTS OF 15 YEARS' EXPERIENCE WITH THE KETOGENIC DIET IN THE TREATMENT OF EPILEPSY IN CHILDREN.*

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Fifteen years have elapsed since the ketogenic diet was instituted for the treatment of epilepsy at The Mayo Clinic. Reports on the results of treatment with this diet were published in 1925, 1927, 1930 and 1933. Sufficient data have now accumulated and follow-up studies have been conducted long enough for us to attempt to answer two very vital questions regarding the value of the diet in the treatment of epilepsy:

First: Previous reports have estimated that 50 per cent of the patients who have idiopathic epilepsy can be benefited by the ketogenic diet, 30 per cent being rendered free from attacks, and 20 per cent becoming improved. Do the studies of 15 years, with 409 patients, bear out these earlier estimates?

Second: If a patient who had idiopathic epilepsy has become free from attacks following the use of the ketogenic diet, what are the possibilities of this patient having a recurrence of seizures?

The Possibility of Benefit.

From 1922 to 1936, the ketogenic diet was used at The Mayo Clinic to treat 501 children with epilepsy. In 92 of these cases the diagnosis of symptomatic epilepsy was made, while in 409, the diagnosis was idiopathic epilepsy. Of these 409 patients, 84 were rendered free of attacks for at least one year. Of the 84, 73 are

* Read at the ninety-third annual meeting of The American Psychiatric Association, joint session of the Section on Convulsive Disorders and the American Chapter of the International League Against Epilepsy, Pittsburgh, Pennsylvania, May 10-14, 1937.

now eating a normal diet, while 11 are still taking the ketogenic diet. The condition of 43 patients was definitely improved over what it was before the diet was started. Treatment of 140 patients is classified as having resulted in failure; although the diet was given an adequate trial, the convulsions persisted. In 142 cases "no coöperation" was obtained. This group consisted of the following classes of patients: (1) those who were given the ketogenic diet for less than two months and then the relatives or guardians abandoned it; (2) those who had been given the ketogenic diet for more than two months but the parents or guardians did not require strict adherence to it; and (3) those who were given the diet at the clinic but nothing was heard of them after they left the clinic.

The above figures show that of those patients with idiopathic epilepsy, in treatment of whom the ketogenic diet was given an adequate trial, 31 per cent became free of attacks and 16 per cent were definitely improved. In all, then, 47 per cent were benefited.

Analysis of 84 Cases in Which the Patients Were Freed of Attacks.

Of the 84 patients with idiopathic epilepsy who were freed of attacks, 42 were males and 42 females. Twenty-eight had petit mal; 27, grand mal; and 29, both petit mal and grand mal. The ages of these patients at the onset of illness is given in Table 1.

TABLE 1.

Age at the Onset of Illness of Patients Who Were Freed of Attacks of Idiopathic Epilepsy.

Age, years.	Less than 1.	1 to 2.	2 to 3.	3 to 5.	5 to 10.	10 to 14.	Unknown.	Total.
Patients	1	6	12	9	42	13	1	84

In Table 2 are given the intervals during which various numbers of patients: (1) received the ketogenic diet, (2) remained free of attacks, and (3) received normal diet after administration of the ketogenic diet had ceased.

Table 3 shows the duration of illness before the patients who were freed of attacks of various types of idiopathic epilepsy were brought to the clinic. Patients who were having seizures of grand

mal were brought to the physician earlier than patients with petit mal, probably because of the more alarming nature of the attacks of grand mal.

TABLE 2.

INTERVALS DURING WHICH VARIOUS NUMBERS OF PATIENTS WHO HAD IDIOPATHIC EPILEPSY (1) RECEIVED THE KETOGENIC DIET, (2) REMAINED FREE FROM ATTACKS, AND (3) RECEIVED NORMAL DIET AFTER ADMINISTRATION OF THE KETOGENIC DIET HAD CEASED.

Interval, years.	Less than 1.	1 to 2.	2 to 3.	3 to 5.	5 to 10.	10 to 14.	Unknown.	Total.
On ketogenic diet, patients	7	30	25	14	7	..	1	84
Free from attacks:								
Patients	..	10	10	10	39	15	..	84
Per cent	..	12	12	12	46	18	..	100
On normal diet since cessation of ketogenic diet, patients	6	7	7	14	29	8	2	73*

* Eleven still receiving ketogenic diet.

TABLE 3.

DURATION OF ILLNESS BEFORE START OF TREATMENT OF PATIENTS WHO WERE FREED OF ATTACKS OF IDIOPATHIC EPILEPSY.

Duration, years.	Petit mal, patients.	Grand mal, patients.	Grand and petit mal, patients.	Total, patients.
Less than 1	4	11	17	32
1 to 2	9	6	3	18
2 to 3	4	4	0	8
3 to 4	3	4	4	11
4 to 5	3	..	5	8
5 to 6	3	..	..	3
7 to 8	2	1	..	3
12 to 14	..	1	..	1
Total	28	27	29	84

Table 4 shows the frequency of attacks before the patients who were freed of attacks of idiopathic epilepsy were started on the ketogenic diet. All the patients who had petit mal were having frequent daily convulsions. The attacks of the patients who had grand mal were less frequent. In the cases in which both grand mal and petit mal existed, the attacks of petit mal were usually of

TABLE 4.

FREQUENCY OF ATTACKS BEFORE TREATMENT WAS STARTED OF PATIENTS WHO WERE FREED OF ATTACKS OF IDIOPATHIC EPILEPSY.

Frequency.	Petit mal, patients.	Grand mal, patients.	Grand and petit mal, patients.	Total, patients.
1 to 20 daily	14	4	18	36
20 to 50 daily	11	0	3	14
50 to 100 daily	3	0	0	3
Weekly	..	1	3	4
Every 2 weeks	..	3	3	6
Monthly	..	6	1	7
Every 2 months	..	6	0	6
Quarterly	..	7	1	8
Total	28	27	29	84

TABLE 5.

HOW SOON CONVULSIONS CEASED AFTER TREATMENT WAS STARTED IN CASES OF IDIOPATHIC EPILEPSY IN WHICH PATIENTS WERE FREED OF ATTACKS.

Interval.	Petit mal, patients.	Grand mal, patients.	Grand and petit mal, patients.	Total, patients.
Before starting diet	0	7*	3*	10
1 to 20 days	9	2	9	20
1 to 2 months	4	3	5	12
2 to 3 months	4	1	0	5
3 to 6 months	5	2	4	11
6 to 12 months	4	0	4	8
1 to 2 years	1	4	2	7
2 to 3 years	..	2	0	2
3 to 5 years	1	4	2	7
Unknown	..	2	..	2
Total	28	27	29	84

* Attacks had ceased within a month before diet was started.

daily occurrence but the seizures of grand mal were rather infrequent.

Table 5, also concerned with patients who were freed of attacks of idiopathic epilepsy, shows how soon convulsions ceased after administration of the ketogenic diet was started. In 69 per cent of all the cases, the attacks stopped within six months. Seizures in 17 (60 per cent) of the 28 cases of petit mal ceased within three months; in approximately 50 per cent of the cases of grand mal and in nearly 60 per cent of those in which both grand mal and petit mal existed, attacks ceased within three months.

The value of the ketogenic diet in the treatment of patients who have symptomatic epilepsy is less than in the treatment of patients who have idiopathic epilepsy. Of the 92 patients who had symptomatic epilepsy and who were given the ketogenic diet, 10 (approximately 11 per cent) have been rendered free of attacks for periods now lasting from one to nine years. Of these ten patients, two have been free of attacks for two years; two, for two to three years; one, for three to four years; two, for four to five years; and one each for five to six, six to seven and eight to nine years. The diagnoses in the 10 cases in which the patients have become free of attacks were as follows: cerebral palsy of childhood (five patients); encephalitis (two patients); residual poliomyelitis (one patient); effect of skull fracture (one patient); and indeterminate cerebral lesion (one patient). Of the 92 patients, 18 (approximately 20 per cent) received temporary benefit and 64 (69 per cent) were not benefited.

The Possibility of Recurrence.

In 1932, Helmholz and Keith reported on 57 patients who had idiopathic epilepsy and who had been "cured" by the ketogenic diet. To be classified as "cured" a patient had to satisfy the following criteria: "He must have been free from attacks for at least one year; have gradually resumed a normal diet; and have remained free from attacks up to the present time (1932)." Because the word "cured" is difficult to apply to a patient with epilepsy, we have used, in its place, the term "free from attacks."

We have attempted to ascertain the present status of the 57 patients who were reported as "cured" in 1932. Within the past

six months, reports concerning 51 have become available to us either by letter or by the patients being brought to the clinic; reports concerning two others were received in 1935. We have been unable to discover the condition of four of the 57. They have not been heard from since 1932. Of the 53 patients concerning whom we have reports, 49 (92 per cent) still remain free of attacks; four (approximately 8 per cent) have had a recurrence of seizures. In Table 6, we have recorded some of the data regarding the four patients who have had a return of convulsions. When we see that

TABLE 6.

SUMMARY OF FOUR CASES OF IDIOPATHIC EPILEPSY IN WHICH SEIZURES HAVE RECURRED* SINCE 1932.

Case.	Years free from attacks.	Years on normal diet.	Comment.
1	7	4½	Attacks returned in form of grand mal. Ketogenic diet resumed and phenobarbital given (½ gm. twice a day). Result: No attacks for 6 months.
2	4	Short time	Diet resumed but attacks did not cease.
3	6	4	1 to 2 attacks yearly for last 3 years. Taking phenobarbital. Did not resume diet.
4	5½	2¼	Petit mal returned in May, 1935. Having attacks at present time. Did not resume diet.

* All four patients had petit mal.

a patient who had epilepsy can go as long as seven years without an attack and then have a return of seizures, it emphasizes to us the care that must be exercised before pronouncing an epileptic patient cured.

Table 7 shows the number of years that each of the 49 patients has been free of attacks. Thirty-nine (approximately 80 per cent) have had no attacks for more than seven years. Forty-four of the 49, or approximately 90 per cent, have had no attacks for more than six years. From the above statistics, the conclusion may be drawn that only from 5 to 10 per cent of patients who have idiopathic epilepsy and who have been rendered free of convulsions by the ketogenic diet, will have a return of seizures.

Thirty-three patients who had idiopathic epilepsy had been classified, in 1932, as having been improved by the use of the ketogenic diet. Concerning 24 of these, reports have become available either by letter or by the patients being brought to the clinic. Concerning nine we have no report. Of the 24 patients, four have been free of attacks for six, five, five, and three and a half years respectively. These four patients continued to take the ketogenic diet until the convulsions ceased and are now back on a normal diet. One more patient is free of attacks from causes other than the diet. Ten still show improvement over their condition before the ketogenic diet was instituted. In nine cases the result must be classified as failure since the attacks have become just as bad as

TABLE 7.

LENGTH OF FREE PERIOD IN CASES OF IDIOPATHIC EPILEPSY, IN WHICH PATIENTS WERE FREE FROM ATTACKS IN 1932 AND ALSO IN 1937.

Years free from attacks.	3 to 4.	4 to 5.	5 to 6.	6 to 7.	7 to 8.	8 to 9.	9 to 10.	10 to 11.	11 to 12.	12 to 13.	13 to 14.
Patients (49)	2*	1	2	5	8	9	7	5	5	4	1
Patients not heard from since 1932 (4). Years free when last heard from	..	1	..	1	..	1	1	..	..	..	..

* These patients not heard from since 1935.

before. It would seem that by adhering to the ketogenic diet, a small percentage of those patients, whose condition has shown some improvement attributable to the ketogenic diet, may eventually become entirely free of attacks.

In 1932, a group of seven cases was reported in which the ketogenic diet had failed to render the patients free of attacks. Following the use of some other type of therapy, the convulsions had ceased. These represent our only control group. The present status of the seven patients is as follows: Five had remained free of attacks. Two have had a return of convulsive seizures. In this small group, therefore, 28 per cent of the patients have had a recurrence of seizures as compared to recurrence in only 8 per cent (four out of 53) of cases in which the patients were rendered free of attacks by the ketogenic diet.

Summary.

Thirty-one per cent of patients who had idiopathic epilepsy were rendered free of attacks and 16 per cent became definitely improved when the ketogenic diet was given an adequate trial. In all, 47 per cent were benefited.

Approximately 11 per cent of patients who had symptomatic epilepsy became free of attacks following the use of the ketogenic diet.

Eight per cent of patients with idiopathic epilepsy, whose seizures were controlled by the ketogenic diet, had recurrence of attacks within seven years following the last attack. No recurrence occurred after more than seven years.

Conclusions.

Studies over 15 years bear out the previous estimates of the value of the ketogenic diet in the treatment of idiopathic epilepsy.

Follow-up studies of patients with idiopathic epilepsy who have become free of attacks following the use of the ketogenic diet, would indicate that recurrence of seizures occurs in only about 5 to 10 per cent of cases within a period of seven years following the last attack. If a patient has gone more than seven years without an attack, the possibility of his having a return of convulsions seems to be slight.

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DISCUSSION.

Dr. Stanley Cobb (New York, N. Y.).—I would like to ask the average age of these patients, because in our experience we have had better luck with those who are under 16 years of age.

DR. J. L. FETTERMAN (Cleveland, Ohio).—I recall in one of the earlier papers by Drs. Helmholz and Widder there seemed to be a tendency to select cases from the standpoint of freedom from organic defect and selection of children who had normal intelligence. I would like to ask Dr. Helmholz if that criterion of selection is still continued, and if the recovered cases were different intellectually from the group of cases which did not improve. Was there any correlation between recovery and initial mental level, either by actual psychologic measurement or general impression of the neurologist?

DR. MORGAN B. HODSKINS (Palmer, Mass.).—I would like to ask Dr. Helmholz how much trouble he has had in getting patients to take the ketogenic diet, how many times he has seen pellagra from a ketogenic diet, and some of the trouble encountered.

DR. WILLIAM W. GRAVES (St. Louis, Mo.).—Should the ketogenic diet alone be considered responsible for the result here reported? Or are barbital or other drugs of that nature, in addition to the ketogenic diet, used? Do you refrain from the use of all drugs during the time you give the ketogenic diet?

DR. PRATT.—Are you using dehydration?

CHAIRMAN LENNOX.—What would be the record of a group of children who didn't receive treatment, a control group? What is the mechanism of the beneficial action of the ketogenic diet?

DR. HENRY F. HELMHOLZ (Rochester, Minn.).—These are all children under 15 years of age.

With regard to intelligence, we do not attempt to give the ketogenic diet to a subnormal child, because these diets must all be carried out in the home, and from experience we know it is impossible to give a ketogenic diet to a child who will not cooperate. I think that is important to emphasize, that we have children approaching normal mentality. We have had too many sad experiences. We know as soon as the child goes home, he takes anything he wants in the way of food, and we do not feel it right to put the parents to the expense, knowing that it will be impossible to carry out the diet. Even where the child is of such mentality that it will cooperate, we have had some interesting experiences.

A girl of about 12 who was having about 60 petit mal attacks a day went down in the course of four or five days to zero. On the third day (I had them bring in a specimen of urine each day to test for ketosis, for the intensity of the diacetic reaction) the test was gone. She had no diacetic acid in the urine. I said to her, "Did you take anything beside what was given you in the diet kitchen?" This she denied. That day she had six attacks. After she got home, she admitted to her aunt that she had taken a piece of bread at the diet kitchen. That youngster the following day had one attack and the day following had none. She is one of those who have gone for more than a

period of ten years without further seizure. I bring that out merely to show how important it is that you have the full cooperation of your patient. As soon as they go home, it is impossible to carry out such a régime if you do not have it.

I quite agree with our chairman that the control group is an important one and we are attempting to get such a group, but it is difficult to know how to control it. It is easy enough to admit by this mode of treatment we are picking out the best group. If we tried the others, it wouldn't be fair. I feel that our material is different from most of the material that you probably would have to deal with. I would say, however, that most of these patients have been treated for a considerable period of time by a number of physicians, and it is our experience that only if the ketogenic diet is very rigidly enforced will you get any results and you need an intense ketosis.

We have written a physician, sent him our booklet and as detailed information as we could give him, but we have not heard of a single good result in such a case, although we have seen a number of such patients who have come to the clinic and been beneficially influenced.

It is difficult to give the ketogenic diet. Its use in urinary infections, as you know, was even more difficult because you were giving it to a group of patients. Now we have mendelic acid and prontolyn to cure our urinary infections, and I hope something else will come along with which we can do better in the treatment of our epileptics.

We have been giving, for many years now, the addition of B and calcium phosphate to prevent any loss of calcium.

DR. HODSKINS.—Did you get any pellagra before doing that?

DR. HELMHOLZ.—We got one case down in Southern Illinois.

With regard to the use of drugs, we are not so "hipped" on the ketogenic diet that we won't use any means possible to try to free the patient from his attacks. If the ketogenic diet alone will not do it, the addition of luminal sometimes will help. Where we have not been able to free the patient entirely from the attacks, the addition of luminal benefits.

With regard to the petit mal seizures in particular, we have never seen a case where the addition of luminal has been of any benefit.

We have tried dehydration without any apparent benefit on those patients in which the ketogenic diet did not prove successful. I think the reason that we haven't seen any benefit from dehydration is that we have so intense a ketosis. Most of our patients get down to from 10 to 15 grams of carbohydrate a day. We usually have a 3 or 4 test for diacetic acid. I don't believe that by the restriction of fluids we get much more dehydration. We have also tried, as McCrory has shown, an acid ash diet in combination with the ketogenic diet. In one or two cases there seemed to be a temporary benefit, but we haven't felt that anything in addition to an intense ketogenic diet has been of a great deal of help in freeing those cases, which with the diet we were almost able to free.

SOME DATA OF THE PSYCHIC MORBIDITY OF JEWS AND ARABS IN PALESTINE.

By L. HALPERN, M. D., Jerusalem.

Comparative psychiatry, which has for its object the study of the psychopathologic peculiarities of different peoples and races, is still in its early stages. Its growth and evolution depend on the accumulation and correlation of data regarding the psychic morbidity of different people under various conditions. Particular interest attaches to those data which bear on population groups of one and the same country. The Jews and Arabs in Palestine present such data. The following study deals with the incidence of psychoses among the two peoples and may perhaps throw a little light on the whole subject.

Both the Jews and the Arabs belong to the Semitic race. However, while the Arabs have preserved the traits and customs of oriental people, the majority of the Jews of Palestine have come back to the land from western countries and brought with them the influence of West-European culture. A closer examination of the Arab population itself shows that the Christian Arabs differ considerably from the Moslems in degree of progress and status of civilization. In Palestine religion and creed are closely associated with distinct social structure, and because of the essential relation of the latter to psychic morbidity, it is advisable for the purpose of study to consider the Jews, Christians and Moslems separately.

The data underlying this study have been derived from three sources; (a) The census of Palestine, 1931, by Mills, which contains also an enumeration of Jewish and Arab mental patients;[1] (b) the special census of Jewish insane in Palestine carried out by the author in 1936;[2] (c) the records of the Arab insane treated at the Government Asylum at Bethlehem, kindly put at our disposal by the Department of Health.

[1] Hereinafter referred to as "Mills Census."
[2] Hereinafter referred to as "Halpern Census."

First as to the prevalence of insanity among the various communities. According to the Mills census the total number of insane in the country in 1931 was 809. The ratio of insane to the then existing population amounted, therefore, to 83 per 100,000. Among the insane listed by Mills there were 453 Moslems, 100 Christians, 249 Jews and 7 of other religions. The rate of insanity by religions was as follows:

TABLE I.

NUMBER OF INSANE BY RELIGION PER 100,000 OF POPULATION ACCORDING TO THE MILLS CENSUS.

Moslems	65
Christians	109
Jews	143

In order to evaluate properly the figures of the Mills census it should be noted that they were obtainable in the course of a general population census and that they cannot be taken as complete or exhaustive for any of the religious groups because of the tendency of the Arab as well as the Jew to regard mental disease as an affliction shameful to the entire family and to conceal its occurrence for that reason. However, in so far as the relation between the insanity rates of the various religious groups is concerned, it may be assumed that the data given by Mills correspond generally with the actual facts. According to these figures, the Jews head the list, the Christians come second, and the Moslems are in the third place.

These differences need not occasion surprise. It must be remembered that the great majority of the Palestine Jews represent the first generation of immigrants. The physical and mental exertions connected with the dislocation inherent in migrations and the adaptation to a new environment put a heavy psychic burden on the newcomer. Experience has shown that this factor constitutes in Palestine the most common cause of psychotic outbreaks, particularly during the first year of residence. It should further be pointed out that as a result of the nature and strain of continuous Jewish immigration, the younger ages markedly predominate in the Jewish population. Whereas the age group of 15 to 30—the one most predisposed to mental malady—amounts in England and the United States to 26 per cent

of the total population and among the Palestine Arabs to 23 per cent, it amounted among the Palestinian Jews in 1936 to 32 per cent. Finally, both the negative and positive significance of the factor of civilization is to be taken into account. Many of the social and individual difficulties inherent in civilization or brought about by it have as a negative result an increased susceptibility to psychic morbidity. On the other hand, the modern ways of life, the enlightened attitude to psychic disease and the better organization of the care of mental patients constitute a positive aspect of the problem. These two factors, which in all civilized countries have resulted in an increasingly larger number of mental patients, naturally also hold good in the case of Jews who immigrated into Palestine from occidental countries.

That the civilization factor plays an important rôle not only among the people of European culture but among those of the Orient as well is demonstrated by the relative prevalence of mental disease in the two religious communities of the Palestinian Arabs. The number of mental patients among the civilized Arab Christians, who by their education and occupation stand on a higher social level than the Arab Moslems, amounted according to Mills to 109 per 100,000 of the population as against 65 among the Moslems. Similarly, the number of Christian inmates in the Government Asylum at Bethlehem amounted to 52 per cent of the total patients hospitalized as against 48 per cent for the Moslem patients, even though the Moslem population is eight times as large as the Christian.

As already stated, the data regarding the prevalence of insanity in Palestine given in the Mills census of 1931 cannot be considered complete for either community. More recent and more complete data are available, however, only with regard to the Jewish community. According to the Halpern census the number of Jewish insane amounted in 1936 to 726. On the basis of the then existing Jewish population, the total gave a ratio of 194 per 100,000. In this census all available sources have been exhausted; namely, an inquiry among the psychiatrists of the country, an enumeration of the mental patients housed in public and private institutions, and an examination of the records of patients awaiting admission to hospitals. It may, therefore, be stated with assurance that the insanity rate of approximately 200 per 100,000 of the

Jewish population established by this census represents the actual situation.

The social factor determining the relation of insanity rates among Jews, Christians and Moslems, is of importance within the Jewish community itself as well. Thus, in conformity with the social level, the frequency index among Ashkenasim or Occidental Jews amounted to 1.12, among Sephardim to 0.79, and among the other Oriental communities to 0.49.

Compared with the prevalence of insanity in most of the civilized countries where the average range is from 300 to 400 per 100,000 of the population, the prevalence of insanity among Jews in

TABLE II.

NUMBER OF INSANE PER 100,000 IN DIFFERENT NATIONS.

Country.	Year.	Number.
Ireland	1911	648
Norway	1920	572
Scotland	1911	496
Switzerland	....	450
England	1911	449
Sweden	1920	446
New York State	1922	405
Denmark	1920	344
Germany	1925	331
Russia	1911	321
Finland	1900	311
Jews in Palestine	1936	194

Palestine amounting approximately to 200 per 100,000 is not unfavorable. Table II shows the comparative figures.

This comparatively favorable aspect of insanity prevalence among the Jews in Palestine, in spite of the difficulties of adjustment previously mentioned, is due largely to the regulations governing the selection of Jewish immigrants. Mentally abnormal individuals are not allowed to enter the country.

The sex distribution of the insane in the various communities is also of significant interest. Among the 119 Moslem Arab and the 133 Christian Arab insane hospitalized in the Government Asylum at Bethlehem during the period of 1922-1936 there were 76 women. The number and percentage for each group are given in Table III.

The Mills census (Table IV) also shows the predominance of male patients both among the Christian and the Moslem Arabs and gives in addition the sex percentages of the Jewish group.

These figures show that among the Jews, unlike the two Arab groups, the number of female insane is larger. This circumstance is brought out even more clearly by the Halpern census, from

TABLE III.

DISTRIBUTION OF ARAB MENTAL PATIENTS BY SEX.

	Moslems.		Christians.	
	No.	Per cent.	No.	Per cent.
Males	96	79.6	80	60.1
Females	23	20.4	53	39.9

TABLE IV.

DISTRIBUTION OF MENTAL PATIENTS BY SEX ACCORDING TO THE MILLS CENSUS.

	Moslems.		Christians.		Jews.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
Males	279	61.5	57	57.0	118	47.4
Females	174	38.5	43	43.0	131	52.6
	453	100.0	100	100.0	249	100.0

TABLE V.

DISTRIBUTION OF JEWISH AND POLISH MENTAL PATIENTS BY SEX IN 1929.

	Poles, per cent.	Jews, per cent.
Males	60.8	43.7
Females	39.2	56.3
	100.0	100.0

which it appears that the number of females among the Jewish mental patients amounts to 441 or 60.7 per cent as against 285 or 39.3 per cent for the males. The proportion of the two sexes in the total Jewish population is approximately equal. The higher prevalence of females among Jewish mental patients has been observed not only in Palestine but also in Poland (see Table V).

This phenomenon is accounted for by the characteristic grouping of mental diseases among the Jews and may be explained, as will

be shown below, by the smaller number of alcoholic and syphilitic psychoses which ordinarily are more frequent among men.

In so far as the age of the mentally afflicted is concerned, it appears from the various data that the general age curve—of Arabs as well as Jews—begins to go up at the 20th and reaches the peak at the 30th year of life, thus differing from psychic morbidity among European nations among whom the peak is reached at a later age of life.

The diagnostic grouping of Jewish and Arab mental patients is of significance for purposes of comparison. The study is based

TABLE VI.

DIAGNOSTIC GROUPING OF JEWISH MENTAL PATIENTS IN PALESTINE.

Diagnosis.	No.	Per cent.
Schizophrenia	341	51.8
Manic-depressive psychoses	146	22.2
Oligophrenia	52	8.0
Paranoia	33	5.0
Psychasthenia	25	3.8
Senile dementia	24	3.6
Organic psychoses	21	3.2
Epileptic psychoses	8	1.2
General paresis	4	0.6
Psychoses due to exogenous intoxication	3	0.5
Alcoholic psychoses	1	0.1
	658	100.0

on information obtained from the records of 658 Jewish patients surveyed by the Halpern census and from 254 hospitalized Arab patients. The diagnoses were classified in 11 main clinical groups. The numbers regarding the Jewish patients above are summarized in Table VI.

This distribution demonstrates a characteristic grouping of the diseases. On the one hand schizophrenia as well as other endogenous psychoses in general are predominant. The endogenic psychoses—schizophrenia, psychoses of the manic-depressive group and paranoia—constitute 79 per cent of the total. On the other hand the percentage of alcoholic and syphilitic psychoses among Jews is very small, amounting together to 0.7 per cent of the

total, as against 18.3 per cent in Poland and 33.8 per cent in Germany.

In the following table is given a comparison of the diagnostic distribution of mental patients among Christians, Moslems and Jews. Since with regard to Arab patients numbers are available only for inmates of hospitals, we have considered for this purpose only those of the Jewish patients who are likewise hospitalized. This will account for the discrepancies in the figures of Jewish patients in Tables VI and VII.

TABLE VII.

COMPARATIVE DIAGNOSTIC GROUPING OF MENTAL PATIENTS AMONG JEWS, MOSLEMS AND CHRISTIANS.

Diagnosis.	Jews, per cent.	Moslems, per cent.	Christians, per cent.
Schizophrenia	70.1	44.9	37.8
Manic-depressive psychoses	10.4	23.7	28.0
Paranoia	1.2	2.5	2.3
Oligophrenia	7.6	1.7	5.4
Senile dementia	2.8	1.7	3.0
Psychasthenia	1.2	4.2	9.1
Oragnic psychoses	2.5	4.2	3.0
Epileptic psychoses	0.9	5.1	2.3
General paresis	0.9	4.2	3.8
Psychoses due to exogenous intoxication	0.6	1.7	2.3
Alcoholic psychoses	0.3	5.9	3.0

A comparison of the distribution of mental diseases in the three population groups of Palestine brings out the distinctive predominance of endogenous psychoses, which is common for all groups. Psychoses of this type account for much more than half of all the cases: among the Jews 81.7 per cent, among the Moslems 71.1 per cent, and among the Christians 68.1 per cent. No definite conclusions can be drawn from the difference in the prevalence of other types of mental diseases, such as oligophrenia, psychasthenia, etc., because of the scanty material available. The one exception shown in the last table is the greater prevalence of alcoholic and syphilitic psychoses among Moslems and Christians than among Jews. There are also other indications that alcoholism is more frequent among non-Jews in Palestine, and it is known that syphilis is prevalent in certain Arab districts.

The psychiatric care of patients in Palestine is still inadequate, and the need of hospitalization rather acute because of the small number of beds available for mental cases. The Government Hospital at Bethlehem as well as the other public institutions are not sufficient to meet the needs of the whole country. The construction of a central hospital for mental patients has been planned by the Government for a number of years, but it still awaits realization.

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PSYCHIATRIC HISTORY AND DEVELOPMENT IN CALIFORNIA.

By MARGARET H. SMYTH, M. D., Stockton, Cal.

The history of San Francisco began in the year 1776, when the Franciscan Friars, Cambon and Pattou, founded the first permanent settlement on the peninsula. For 60 years the Spanish Rancheros and the Indians of the Mission led an uneventful life until the coming of the Hudson Bay Company in 1836, when San Francisco became important as a trading post. Ten years later her Spanish-American settlers were disturbed by the capture of Monterey and by the march of General Fremont's troops on the way to Sutter's Fort on the Sacramento River. Not until 1848, however, when gold was discovered in California, did San Francisco, just passing from the possession of Mexico to that of the United States, suddenly emerge from a Spanish village into a busy, energetic American town.

In one year, in addition to the "prairie schooners" that found their way across the continent, 500 ships bearing gold seekers found their way around the Horn, while many other adventurers made the short cut by way of the Isthmus of Panama. By the end of 1852, the city's population made up of some 15,000 Spanish and Indians from the Mission settlement, French and English from the Hudson Bay Post and the scattering of American soldiers, had increased to 45,000. This increase was composed of men of every nationality and class and color. Cadets from rich families drawn by adventure and the wish to found their own fortunes; young men back from college; shopkeepers selling out small businesses; plain farmers and workmen, as well, all struggled and fought and fused into a new type as portrayed by Bret Harte and the Argonauts of '49.

The need for hospitals soon became a pressing one and two general hospitals were established in the state, one each at Stockton and Sacramento. The State Marine Hospital at San Francisco was also maintained by the state, but was designed to serve the seamen, who in that day of long voyages were liable to scurvy, and it was

considered a matter to be expected that every incoming ship would bring a large grist of sick seamen and passengers.

In the old hospital register is recorded the fact that in 1850 there were 22 cases of insanity in the state, all being held in San Francisco; 14 of them were held in the station house, 3 under the care of the Marine Hospital and 5 "secured" on the prison brig "Euphemia," which was anchored in the Bay.

In 1852 the General Hospital at Sacramento "accomodated" 34 cases of insanity, and the General Hospital at Stockton a group of 13 insane. The legislature of 1852 ordered that thereafter all insane in the state be sent to the Stockton Hospital and during this year 124 cases were received, including those transferred from the General Hospital in Sacramento and from the "receptables, which in that day were the station house and the prison brig "Euphemia." In 1852, the legislature abolished the State General Hospital at Stockton and created the State of California Insane Asylum. All the patients were removed on July 1, 1853, and the institution was formally opened as an institution for the care of the insane. The cities of Stockton and Sacramento were chosen because these cities were at the head of the Sacramento and San Joaquin Rivers and were the distributing points for supplies for the mines in California and Nevada.

The land provided for the Insane Asylum in Stockton was donated by Captain Charles M. Weber, who was the owner of a large land grant bought from the Mexican Government in 1843. The gift consisted of 100 acres, which with the addition of a few more acres purchased by the state, is at the present time within the city limits of Stockton, and comprises 34 city blocks.

In the Book of Records of 1852, in the handwriting of Robert K. Reed, M. D., the first superintendent of this hospital, it is recorded that admissions into the General Hospital in 1851 were 162; to the General Hospital in 1852, 1064 and to the General Hospital in 1853, 1870. The Insane Department in 1852 admitted from May to December 124; discharged 52; died 10; remaining in hospital 62. In 1853 the Insane Asylum admitted 284; recovered 160; died 22; remaining in hospital 102.

From this hospital record, out of the catalog of 124 names admitted in the year 1852, 4 were women. Among these, one woman, "Mary Anna" came from France.

Age 25. Sent to the hospital from the station house in San Francisco. The report states that she was brought to California from Montevideo by the captain of some ship, who promised to marry her. "She is engaged most of the time in prayer. August 2, talkative, violent. October 10, quiet and disposed to work. March 10, 1853, perfectly rational. July 20, 1854, fought all the attendants." (Dr. Reed resigned this year and there are no more records on this patient.)

This and other records written by Dr. Reed are interesting on account of their brevity, conciseness and graphic description.

His record on Raphael Rivera of Acapulco, Mexico, stated:

Age 39. Came from San Francisco to Stockton. Deranged one month or more. Cause, love, courtship, matrimony and a fight. As a solace, bad liquor and opium. The finale, "Mania a potu," the police office, and the hospital. 1852, October 1, repentance. Discharged. A feast, a dance and departure to San Francisco next day.

Phillip Kettler of New York. From San Francisco to Sacramento, thence to Stockton. A clerk and not married. In California one and one-half years. Noisy, preaches on religion, temperance, injustice of mankind and the reorganized nation of society.

1852, May 14. John Devin. Medina County, Ohio. Came across the plains in 1850. At home a farmer, in Cala—a miner. At Hangtown, Eldorado County, stole a horse, saddle and bridle. Was caught and tried in a Mustang Court. Was sentenced to be hung and led out for execution when some of his friends arrived and proved his insanity, when he was released and brought to the hospital. Weak and emaciated from the effects of chronic dysentery. "Dementia." Not married. Parents live in Seville, Ohio. October 18, 1852—died.

1852, Dec. 10. Walton Van Loan. New York. Age 18. A young man of active mind and good education. Says he is a professor of drawing and painting and a teacher of music. Was engaged on the Coast Survey under Lieut. Davidson. For 16 days and nights was constantly at work on a map. Probable cause—continued mental excitement and severe application; was also in love with Kate Hayes a "ventriloquist." Sent by Mayor of San Francisco to hospital. Has been bled and blistered, purged and fed on water and bread with seton in neck, etc. Ordered: tincture iron wine and a nutritious diet and an opiate at bed time. Address: Father W. D. Van Loan, U. S. Ap. Off., San Francisco. January 5, 1853, discharged and sent to San Francisco.

In 1863 provision was made for a state tax of 5c on each $100 of valuation for the purpose of erecting buildings for the care of the insane; the legislative committee delegated a board of five directors, appointed by the governor, to supervise the service for the insane of the state who were assisted by a group of four physicians, also appointed by the governor, known as medical visitors who con-

ferred with the superintendent on matters of treatment, policy, etc., and who made a pilgrimage to the institution periodically and investigated all complaints.

In this year their report to the governor states that they have made a thorough investigation of the management of the hospital. They describe the new buildings in detail, especially the seven wards which allow a "classification of the patients, an important curative necessity, which before the erection of these buildings was very deficient in this institution." From this report, we note the statement "if such institutions are overcrowded, or if the needful attention and healing influences due to each individual are insufficient, the restorative process is retarded and the percentage of cures necessarily diminished. To secure the beneficial effects of medical treatment sufficient room is indispensable and although the new accommodations afforded by the new buildings have been a great relief, there nevertheless still exists a disproportion between the number of inmates and the conveniences for their proper care and treatment. The present buildings afford facilities for the proper care of not more than four hundred fifty patients, and there are at this time over six hundred fifty crowded into the asylum. The question arises, What is to be done? Manifestly there are only two ways—get rid of one-third of the present inmates and adopt some rule whereby the number admitted will never exceed those discharged, or build new buildings. We cannot recommend the first as it would greatly discredit the fair fame of the state. We cannot recommend the establishment of new institutions; therefore, we recommend the building of additional buildings."

In 1860 there was much discussion concerning the building of a separate institution for the curable and the incurable, the proposed new institution for the curable cases to be at the Stockton Asylum. The measure was hotly contested and in the end the committee recommended that the measure be deferred indefinitely.

In that day abuse of a patient was made a matter of legislative investigation. The sixteenth session of the legislature in 1865-66 was presented with a report in which the committee stated that the service had so fallen below the standard set for such work in this state, that "the Asylum seemed to be in a process of transition from a curative establishment to a mere prison house for the inmates." This report caused the legislature to demand a com-

plete house-cleaning involving the removal of the superintendent for permitting an attendant to abuse a patient, and for permitting application of restraint in defiance of orders of the board of directors and the medical visitors, who were advocates of moral treatment.

In 1869 the literature of the state hospital service reports that rules and regulations were unequivocal in their directions regarding the attitude to be maintained by the hospital personnel toward the patient. There were 22 regulations for the guidance of attendants. No. 17 called for "outdoor work for the benefit of the patients. They will be permitted and encouraged to engage in outdoor work under the care of attendants or other subordinates; none will be taken from the halls or yards for this purpose, except by direct order of the supervisor. They must not be overworked, nor permitted to overwork themselves, nor to work against their will; neither must they be asked to do what they feel to be degrading. The attendants must work with the patient, and be careful not to appear to be ordering or superintending, but to direct by example, assistance and advice." Rule no. 18 admonished attendants to devise "ways and means of keeping their patients busy and amused." Rule no. 19 treats of mechanical restraint. "The use of restraining apparatus is prohibited except by express permission of the superintendent or assistant physician. Seclusion in private room, or personal care of additional attendants until further direction from the superintendent or assistant physician can be obtained."

It should be mentioned here that even though these pioneer medical men were separated by a continent from their fellow practitioners, yet they kept abreast of the advancement then being made in the field of mental science. They heartily approved the humane crusade sponsored by Dorothea Dix, and in the report to the governor made in 1869 by the directors and medical visitors, the superintendent acknowledges receipt of valuable favors from Miss Dix, books, pictures, etc., which were delivered free of charge by the Pacific Mail Steamship Company. "Thanks is extended the California Steam Navigation Company and the Marsh Pilsbury Company by whose aid they arrived at the Asylum without extra expense." This contribution laid the foundation for the Dix Library for the women's department and a like contribution of one hundred volumes and colored engravings from John Pierson of

New York, which came around the Horn on the ship Comet, free of charge, became the nucleus around which grew the library for the male department.

Regarding the nativity of the 482 admitted in 1869, 283, or two-thirds, were foreign born; 179 were born in other states and only three were Californians of the old civilization which in 1848, was 15,000 whites, mostly of Spanish origin. The superintendent's report of that year quotes some of the progress made in the field of insanity by able alienists, devoted philanthropists and wise statesmen, in their zealous effort to establish hospitals, who had worked assiduously to correct ignorant prejudices, and abolish cruelty and see that this young, advancing state was well in the forefront of this movement; and he begs "that this fair State will not by an inconsiderate step turn back half a century from the light and progress of the age by the establishment of separate institutions for the incurable cases of insanity," which proposition was up before the people for consideration on the score of economy, holding that the chronic and harmless could be housed in much less expensive buildings. The superintendent argues that "such institutions would encourage their complete isolation from the world. The patients authoritatively adjudged incurable, no improvement in their mental condition would be expected. They would evoke no visits, no vigilance, no scrutiny from without, no desire to be approved, no love of applause, no professional encouragement or ambition from within; nothing but a divinely inspired management could keep an institution thus composed from degeneracy. The program would aid in sustaining the old and erroneous idea that insane persons never recover, that they are not subjects for medical treatment, but for confinement only, that the uninformed and untraveled masses would relearn the lessons of their forefathers in their view of insanity and asylums it should be borne in mind that insanity is but the evidence of a symptom of a disordered condition of the brain or nervous system, as a cough would be of the respiratory system, one is as naturally the subject of medical treatment as the other, and either may or may not be curable, according to the nature and extent of the disease."

The matter of building to meet the increase in admissions was viewed with extreme concern, and on February 18, 1870, the legislature passed an act authorizing a study to be made of the situation,

and authorized the appointment of a "Commissioner in Lunacy" to make such a study, who was to visit the principal asylums of the United States and Europe and to collect and compile all accessible and reliable information as to management, different modes of treatment, the statistics of insanity, with special reference to Great Britain, Ireland, France and Germany.

Dr. E. T. Wilkins was selected for the task, and December 2, 1871, he presented his report to Governor Haight. He described his investigation regarding the problems of insanity in other countries, and how they were met. He quoted, much to the public anxiety and concern, that there was a peculiar "marasmus" prevalent throughout the state which acted as a contributing cause of insanity. He introduced to the public mind the fact that there was to be expected a certain number of insane to each one thousand of every normal population, and with the tremendous increase in the number of people coming into California, a natural increase in the number of insane could be expected. Therefore, the legislature backed by the public, set about making proper provisions to meet the situation.

Dr. Wilkins is quoted here: "Having spent sufficient time at Stockton to become familiar with the construction requirements of an asylum, its general management, we started out to compare its good features and glaring faults with those of other states and countries, the comparisons have in some instances been in our favor." It may be interesting to note that at the time Stockton was the largest and best "Insane Asylum on the continent."

By November, 1875, the Stockton Asylum had 1500 patients, 500 more than capacity which at that time was recognized as being 1000 beds. On November 15, 1875, Napa Asylum was opened to relieve the over-crowding. By 1880 there were 864,690 in the general population; hospital admissions were 686.

The report to the governor made by the board of directors for the years 1882-84 included recommendations made by the superintendents of Stockton and Napa that an additional asylum be provided, that since the over-crowding of Napa, the Stockton inmate population had again risen to 250 over capacity. Plans were being made to establish Agnews Asylum, the third hospital built in the state.

There is in the State Government a Department of Institutions. This department is under the control of an executive officer known as the Director of Institutions. The director is appointed and holds office at the pleasure of the governor. The Department of Institutions has jurisdiction over the following institutions:

Agnews State Hospital.
Camarillo State Hospital.
Industrial Home for the Adult Blind.
Mendocino State Hospital.
Napa State Hospital.
Norwalk State Hospital.
Pacific Colony—State Narcotic Hospital.
Patton State Hospital.
Sonoma State Home.
Stockton State Hospital.

This department also has jurisdiction over

Whittier State Hospital.
Preston School of Industry.
Ventura School for Girls.
California Bureau of Juvenile Research.

The superintendents of the northern and southern hospitals meet once monthly for general conferences, at which twice a year the director of institutions and his assistant are present.

AGNEWS STATE HOSPITAL.

Agnews State Hospital is located in Santa Clara County. This hospital was founded in 1888 under the statutes of 1885. Date of first admission, October 26, 1888. The State's capital investment to date is $3,524,705.63. Normal capacity is 2365. Present population is 3373. The commitments received at this hospital are mainly from those counties nearest the State Hospital: namely, San Francisco, Alameda, Santa Clara, San Mateo and Santa Cruz. Agnews State Hospital is six miles north of San Jose. Number of physicians, 10; dentist, 1; nurses and attendants, 297. Hospital clinics are held daily, except Saturday, Sunday and holidays. Additional clinics frequently held at hospitals, universities, medical schools and other institutions. Out-patients clinic is held every Wednesday afternoon at the hospital at 2:00 p. m. Total number of officers and employees, 398. Care provided—medical, surgical, psychiatric and custodial care of all patients. After care or parole work—visits by social service worker to paroled patients monthly. Monthly reports by letter from relatives and guardians from paroled patients. Number of patients on parole, 641. Climatic conditions, average annual mean temperature, 60.2 degrees.

Agnews State Hospital had the misfortune to tumble down during the earthquake on April 6, 1906, with the loss of life to a number of patients, one physician and head nurse and supervisor. The hospital upon re-building, is a great improvement over the old one and is considered one of the finest hospitals in the state. The present superintendent, Dr. E. W. Mullen, succeeded Dr. J. M. Scandlon, who in turn, succeeded the venerable Dr. Leonard Stockton, who had been superintendent of this hospital for a period of 30 years.

CAMARILLO STATE HOSPITAL.

Camarillo State Hospital is located at Carmarillo, Ventura County. This hospital was founded in 1929 by statutes of 1929. The institution opened for admission November 1, 1936. The buildings are beautifully located and are about one hour's drive from Los Angeles. This hospital is still building and is receiving patients from time to time from the Norwalk and Patton State Hospitals in San Bernardino and Los Angeles Counties. The buildings are of beautiful Spanish design. Thomas W. Hagerty, M. D., is medical director and superintendent.

MENDOCINO STATE HOSPITAL.

Mendocino State Hospital, Post Office Talmage, Station Ukial, County Mendocino. This hospital was founded by statutes of 1889. Date of first admission December 8, 1893. The state's capital investment to date is $3,266,598. At the present time there are 300 so-called criminal insane at this hospital. Number of physicians, 6; dentists, 2; total number of employees, 325. Care provided—psychiatric, general medical, surgical, dental clinic, laboratory, etc. After care, regular visits to paroled patients. Number of patients on parole, 237. Climatic conditions—average annual mean temperature 55 degrees. Total acreage 1215. Dr. R. A. Cushman, medical director and superintendent.

NAPA STATE HOSPITAL.

Founded 1875 by the statutes of 1871. The state's capital investment to date, $4,056,938. Normal capacity, 2648. Present population, 3456, excess, 808. Total acreage, 2148. Climatic conditions—average annual mean temperature, 57.2 degrees. Napa State Hospital is situated on the State Highway in the picturesque Napa Valley. The architecture of this hospital is interesting; as one drives near and sees the spires, one might think he was approaching a French chateau. J. M. Scanland, M. D., medical director and superintendent.

NORWALK STATE HOSPITAL.

Norwalk State Hospital is located in Los Angeles County at Norwalk. This hospital was founded in 1916 by the Statutes of 1913. Date of first admission—February 16, 1916. When the selection of the land for this hospital was

considered there were two sites suggested, one being the famous Signal Hill where oil was found later, and if this location had been selected, the proceeds from the oil would have paid in great part for the upkeep of all the hospitals in the state. Normal capacity, 1718. Present population, 2559. Excess, 841. Practically all patients come from Santa Barbara, Kern, Inyo and counties south. The majority come from Los Angeles County. Number of physicians, 7; dentists, 1; total number of officers, 313. Dr. Edwin Wayte, medical director and superintendent.

PATTON STATE HOSPITAL.

Patton State Hospital is located in Patton, County of San Bernardino. This hospital was founded in 1889 by the statutes of 1889. First admission August, 1893. Normal capacity, 2660. Present population, 4081. Excess, 1424. This was originally built as a homeopathic hospital, but later was changed. Patients are received from Los Angeles and the southern counties, including Ventura, Kern, Orange, Riverside, San Bernardino, Imperial and San Diego. G. M. Webster, M. D., medical director and superintendent.

STOCKTON STATE HOSPITAL.

Stockton State Hospital is located at Stockton, San Joaquin County. This hospital was founded in 1851 by statutes of 1851. Normal capacity, 2866; present population, 3782. Excess, 916. The State Farm 2½ miles from the city, 1000 acres, cares for 850 men patients. Will have accommodations for 600 more at the end of this year when buildings in course of erection are finished. Margaret H. Smyth, M. D., medical director and superintendent.

PACIFIC COLONY.

This hospital at Spadra, Los Angeles County was founded May 27, 1927, by the statutes of 1917. Normal capacity, 720. Present population, 832. Excess, 112. Type of admission—upon petition of the court—"feeble minded." Method of admission: application is first made to the probation department in the county in which the applicant is a resident. It is then put on the calendar for regular commitment. The superintendent of this home is also the superintendent of the State Narcotic Hospital at Spadra. Thomas F. Joyce, M. D., medical director and superintendent.

CALIFORNIA BUREAU OF JUVENILE RESEARCH

Post Office Stanford University, Palo Alto, County of Santa Clara. Type of patients—problem children, court cases, feeble-minded, school problems. Normal clinic load per year, 600. Method of admission, through the request of a public agency, probation officer, school officer, institutional head, parent, health officer. Number of psychologists 3, including director. The Bureau of Juvenile Research is charged with the supervision of psychological and

research work in institutions in which there are children. In addition to service to the Whittier State School and the Ventura School for Girls, the Bureau supervises the educational and psychological work of Pacific Colony, one of two homes for feeble-minded children. The Bureau publishes the "Journal of Juvenile Research" which is now in its eighteenth year, a bulletin series, scientific articles, monographs, books and other publications. The Bureau has given scientific consultant service to the California coordinating Councils and the California Commission for the Study of Problem children. Norman Fenton, Ph. D., chief of Bureau.

SONOMA STATE HOSPITAL.

This hospital is for the epileptic and feeble-minded and is located at Eldridge, Sonoma County, in the Valley of the Moon. Founded December 10, 1885, as a California home for the care and treatment of feeble-minded children. After care or parole work—home investigations before placement and regular follow up visits by social service workers. One supervising psychiatric social service worker and two psychiatric social service workers at the institution. Two in San Francisco covering the metropolitan area and peninsula. One in Oakland covering East Bay area. Number of cases on parole, 651. Out-patient clinic held at Santa Rosa once a month, and various communities in northern part of the state once a year. Charges for board and care paid by the county from which the patient is committed. Average annual mean temperature 64 degrees. F. O. Butler, M. D., medical director and superintendent.

PRESTON SCHOOL OF INDUSTRY.

(Correctional School.)

Preston School of Industry is located at Ione, Amador County, fifty miles from the City of Sacramento. Charge for board and care from county in which committed. Average annual mean temperature 61.4 degrees. O. H. Close, superintendent.

VENTURA SCHOOL FOR GIRLS.

Ventura, Ventura County. Type of admission, delinquent girls, all court commitments. Average annual mean temperature 64 degrees. Olive P. Walton, M. D., medical director and superintendent.

WHITTIER STATE SCHOOL.

(Correctional School.)

Whittier State School is located at Whittier, County of Los Angeles. Number of physicians, 3; dentist, 1. Average annual mean tempeature 62.8 degrees. E. J. Milne, superintendent.

INDUSTRIAL HOME FOR THE ADULT BLIND.

Robert V. Chandler, superintendent. 3601 Telegraph Avenue, Oakland, County of Alameda.

The hospitals began within a few years after they were established with an excess of patients to capacity. This condition as the years have gone by, has increased, rather than lessened. At the present time, there are 26,055 in the state, with an excess population of 5888.

Preventive measures such as sterilization, mental hygiene, information regarding stamping out of syphilis, supervision of child guidance clinics are part of the regular program of all California state hospitals and feeble-minded homes.

EUGENIC STERILIZATION IN CALIFORNIA.

California adopted its first sterilization law April 26, 1909. This law has attracted attention from countries all over the world. The German government applies sterilization systematically in accordance with its law, the total number of operations to date having reached something like 250,000. Investigators agree that the policy there is being enforced in a scientific spirit without racial or political implications and with a minimum of difficulty.

The leaders in the German sterilization movement state repeatedly that their legislation was formulated only after careful study of the California experiment under (as reported by) Mr. Gosney and Dr. Popenoe. It would have been impossible they say, to undertake such a venture involving one million people, without drawing heavily upon previous experience elsewhere.

The German numbers are overwhelming in comparison with those of California, which up to January 1, 1937, totalled 11,484. The total number of official sterilization in the United States to January 1, 1937, was 25,403.

While California law gives the right to sterilize without the consent of the family, this consent is always obtained before an operation is considered. Then the attending physician presents his recommendation to the hospital staff. If all agree it is sent by the superintendent of the hospital to the director of institutions for his approval. According to the rules and regulations of the Department

of Institutions, the question of sterilization must be presented not only to the family of the patient but to the patient himself.

Every patient committed to a hospital or home for the feeble-minded who is to be sterilized at any state institution shall be notified of such proposed sterilization operation at least ten days prior thereto and he shall be informed that he may protest such sterilization operation in writing to the department with his reasons for such a protest. A notice shall be sent to the patient's guardian or nearest relative, advising him of such proposed sterilization operation at least ten days in advance of such operation and such person shall have the same right to file a protest with the department. Before a sterilization operation is performed on any patient, a recommendation therefor, submitted on the proper form, shall be made by the superintendent to the department. Accompanying such report form there shall be a copy of the consent to such operation by the nearest relative or guardian or a statement from the superintendent as to the reason for consent not being secured. After approval by the director for the performance of the operation is received by the superintendent, he may order such operation performed.

Patients who are admitted to the hospital voluntarily are not sterilized although there are many requests for sterilization and many requests for admission to the hospital in order to have a sterilization. Recently a man sterilized 25 years ago, who at that date was allowed to come at his own request on account of his wife's condition, made application to have his son sterilized as his wife, also, was unable to bear children. This request was not granted on account of later regulations as to the sterilization of voluntary patients, and none but mental patients are ever considered for sterilization.

CALIFORNIA HOSPITALS AND THEIR CONTRIBUTION TO THE COMMUNITY.

The hospitals of California are under the Department of Institutions and their work is much alike. The hospital at Stockton carries on a definite program of distributing mental hygiene information in the way of out-patient clinics, parole clinics, juvenile court and child guidance examinations. In all these extra-mural

activities is stressed the concept of mental hygiene which seeks to build up sound mental health, prevent and cure mental disease.

One physician of this hospital is in charge of the out-patient department which consists of child guidance clinics which are held two afternoons a week during the school year, on Thursdays and Fridays from one to five. The juvenile court cases are examined in the hospital every Wednesday from one to five. At these clinics the psychiatrist and social workers make a report. A psychologist is only occasionally engaged to make examinations.

The out-patient clinics for the patients who are home on parole are held in six counties where the patients are invited to meet at the health center in densely populated districts. Two clinics are held in each county annually. The counties other than San Joaquin which are served in this manner are San Francisco, Alameda, Stanislaus, Fresno and Sacramento counties. Patients from adjacent counties are invited also to attend these clinics and often they come from great distances, as much as one hundred miles in some cases. The mental hygiene clinic is not only a great blessing to the community but also presents an opportunity for the superintendent and medical staff of the hospital to be brought in contact with early personalty changes and beginning mental disorders for which prevention and early treatment are possible.

Correspondence.

To the Editor of The American Journal of Psychiatry:

I have noted with interest the article by Dr. H. R. Carter, "Herpes Zoster Following Lumbar Puncture," as published in the September, 1937, number of The American Journal of Psychiatry. Dr. Carter states that a review of medical literature on herpes since 1810 fails to show any report of the occurrence of herpes zoster following the procedure of lumbar puncture.

It may interest you to know that in 1915, at the February 10 meeting of the Clinical Society of the University of Michigan, I presented before the Society, from the psychiatric clinic, a patient who showed this same condition with the following comments recorded at the time:

Dr. Haskell.—There is another interesting and unusual complication in this case. I had hoped that Dr. Stokes would spontaneously discuss it. This patient has been receiving intraspinal injections of old salvarsan in blood serum without previous intravenous injection, according to the method of Ogilvie. On the third day following his third injection he developed a skin condition on the outer aspect of his left thigh. We thought at first of an anaphylactic reaction due to his eating strawberries the night before, which he said frequently caused such an eruption. The next morning, however, the condition had progressed far enough to be recognized as a herpes zoster, involving by that time the outer aspect of the thigh, reaching in front to the left side of the scrotum and also present over the buttock in two patches, in other words occupying the area of the cutaneous supply of the second lumbar nerve.

The relation of the zoster in this situation is rather puzzling. It may, though not probably in this case, be of the primary infectious type. It is described as a rare 'trophic' complication of general paralysis and is also occasionally seen in tabes. It has been reported as resulting reflexly from intramuscular injections of mercury. It not infrequently follows the use of arsenic by mouth, as in the treatment of psoriasis, and has been reported in the literature of more recent years as a complication following the intravenous injection of salvarsan.

There is no case reported in the literature of a herpes zoster following intraspinal injection of salvarsanized serum. Dr. Wile reported Dr. Camp's description of certain changes in the cord following his use of Ravout's

method of treatment, which he interpreted as toxic in nature. We must grant then the possibility of such an action. In a large number of such treatments I had never before had such a complication.

Herpes zoster has been described following intraspinal injection of cocaine solution in producing spinal anesthesia and there are one or two cases, thought to be traumatic, where the condition has followed a mere lumbar puncture. Pending future developments in this case, I am of the opinion that during the puncture the sheath of the ganglion may have been nipped by the needle due to sudden struggling by the patient, and that with such an impairment of the structure of the ganglion the arsenical solution was able to work its toxic inflammatory effects with the resulting herpes zoster.

Dr. J. H. Stokes.—There is very little that can be added. It would be difficult to establish apropos the zoster a diagnosis of arsenical zoster in this case. Arsenical zoster occurs usually after the administration of arsenic by mouth or the intramuscular administration of salvarsan. When I first saw it I thought of arsenic on account of a previous intradural injection. The question as to whether it is or is not a zoster can be settled in the affirmative. He certainly had a herpes zoster of unusual distribution. From that fact alone, however, it is impossible to establish a case in favor of arsenic zoster. I don't think that we would attempt to maintain that at all.—(*Transactions of the Clinical Society of the University of Michigan, Volume 6.*)

Very truly yours,

Robert H. Haskell.

Comment.

THE 1938 MEETING.

It happens that the greater number of members of The American Psychiatric Association come from the provinces and states east of the Mississippi River.

There are a great many reasons why all of us of this eastern region who can possibly attend should contribute through our presence to making the approaching San Francisco meeting memorable.

Never before has there been greater need for exchange of ideas and opinion between representatives of *all* our commonwealths not only as to clinical problems, methods of treatment, research, medical and community education but also as to the grave questions incident to hospital administration and the attitude of the various state governments toward their mental hospitals.

Psychiatry assumes and is forced to take on constantly increasing responsibilities with their attending difficulties. Our Association offers the greatest forum for the discussion of these matters to the end that there may be common understanding and cooperative effort.

Our meeting is to be held in one of the great cities of a state remarkable not only for its natural beauty but for its history and culture. We should return after our experience refreshed and with broader view.

Ross McC. Chapman.

PROFESSOR SIGMUND FREUD.

We have for a long time witnessed in silence the indignities and cruelties inflicted on men and women and their families, some of them our colleagues and friends, many of them distinguished contributors to the fine culture that was Germany's.

We have been silent because we well knew that to express our feelings through vehement protest or condemnation would be to the disadvantage of those for whom we would speak.

It is not that an assault on a home is unique. It is all too common; but a special poignancy is added to our distress at this time for it is reported that the home of Professor Sigmund Freud has been invaded, his passports taken, his personal effects disturbed.

The following message signed by the President of the Association has been sent through our Secretary of State to the German Foreign Office:

> Speaking in the name of American psychiatry for 2000 American psychiatrists I voice our earnest hope that everything possible be done to protect Professor Sigmund Freud of Vienna from disturbance. Professor Freud, who has contributed so magnificently to medicine and to the welfare of humanity, is a sick old man. His hundreds of friends in America are deeply concerned about him, beg that every consideration be given him and that his home be kept peaceful.

R. M. C.

PSYCHIATRIC CLINIC AT GUY'S HOSPITAL.

A new and very significant development at the world famous Guy's Hospital in London has been announced. A gift of £43,000 has been received from "Five Friends" for the purpose of establishing at this hospital a psychiatric clinic with 42 beds. The significance of this step will be obvious when it is realized that now for the first time in England a psychiatric clinic will be incorporated in a general teaching hospital. The donors had before them the example of similar clinics abroad, and especially the American model, of which in the minds of British psychiatrists the Phipps Psychiatric Clinic at the Johns Hopkins Hospital is the prototype.

Dr. R. D. Gillespie of Guy's Hospital, discussing the new department in a letter to the editor says:

> The foundation of such a clinic in a general teaching hospital in England constitutes an important advance in the movement to bring psychiatry into closer contact with general medicine than it has hitherto enjoyed. Guy's Hospital has one of the largest medical schools in the country, and it is hoped that this example may ultimately be followed elsewhere. At present the psychiatric education of medical students in England has proved a

good deal more limited than it need be. There is a statutory compulsory course of clinical demonstrations usually given at the county mental hospital, which is the equivalent of a state hospital in the United States. There is nothing else in psychiatry that a student has to do in order to qualify. A recent conference on the revision of the curriculum made recommendations for the provision of additional tuition but enforced nothing new.

As regards actual arrangements for patients at general hospitals there is at most, but not all, the large teaching hospitals an out-patient department for psychiatry; but in only three of the teaching hospitals in the London area are any beds provided for psychiatric patients, and Guy's is one of these. Such beds are placed in the ordinary wards, and even at King's College Hospital where an entire ward has been taken under the care of the nearby Maudsley Hospital, the types of case that can be admitted are very restricted.

One of the results of the limited provision hitherto made for mental patients is that the public still tends to look askance at institutions for the care of such patients; and it is hoped that the establishment of a psychiatric clinic in a general hospital will not only attract the attention of students more forcibly to this important branch of medicine but will influence public opinion favorably towards mental illness in general.

From the patients' point of view a clinic of this kind will have the advantage of obviating the "stigma" of entering a mental hospital, which is still too prominent in the British Isles. There is a strong tendency, even today, to delay admissions of patients to mental hospitals or to divert them to homes not specifically intended or equipped for the treatment of mental illness. Furthermore, the close relationship of the psychiatric clinic to the other general hospital services will greatly facilitate certain types of treatment, and should serve as a stimulus both to the psychiatric staff and to the staff of the general hospital as a whole.

It is intended in the organization of the clinic to provide sufficient medical staff to ensure that their duties will not be confined exclusively to work in the clinic itself, but that they shall also include consultative and teaching activities in the other departments of the hospital. It is also hoped as the clinic is organized to develop its facilities as far as possible from the research point of view.

In its financial aspect the clinic has to be self-supporting as an endowment is at present lacking. It will therefore have to serve mainly the class of patients who can afford moderate fees. It is a requirement of the donors, however, that any opportunity to present itself in the future for providing free beds is to be made use of.

All of this is very welcome news, and Guy's Hospital is to be congratulated upon a development which the five excellent friends have made possible, and which assuredly represents a milestone in British psychiatry.

CENSUS OF MENTAL PATIENTS IN THE UNITED STATES.

The Director of the Bureau of the Census, Department of Commerce, Washington, D. C., issued on January 10, 1938, a preliminary statement of the annual census of patients in hospitals for mental diseases for the year 1936.

There are in the United States 516 hospitals for the mentally ill, distributed as follows:

State hospitals	174
Federal hospitals, including 25 veterans' hospitals	27
County and city hospitals	73
Private hospitals	242
Total	516

Of this number five county and city hospitals and 43 private hospitals did not submit reports. The census data therefore represent the returns from 468 institutions, of which 174 were operated by states; 27 were federal hospitals; 68 were county and city institutions; and 199 were private.

At the beginning of 1936 there were 469,100 patients on the books of these institutions, and of that number 84.8 per cent were in state hospitals, 8.1 per cent in county and city hospitals, 4.7 per cent in veterans' hospitals, and 2.3 per cent in private hospitals.

During the year 150,208 admissions were received, of which 67.8 per cent were admitted to state hospitals, 9 per cent to county and city hospitals, 5.4 per cent to veterans' hospitals, and 17.8 per cent to private hospitals.

Among those patients on the books of the hospitals at the beginning of 1936 there was a slight preponderance of males in public mental hospitals, including county and city; and a ratio of 1 female to each 1000 males in veterans' hospitals. In private hospitals there was a slight preponderance of female patients, the ratio being 1 male to 1.6 females.

About two-fifths of the first admissions during the year 1936 were afflicted with one or another of three types of psychosis. Dementia præcox constituted 18.2 per cent, manic-depressive 11.7 per cent, and psychosis with cerebral arteriosclerosis 10 per cent. The alcoholics constituted 4.8 per cent. Dementia præcox was the

most frequent type of psychosis in each class of public mental hospitals, while the manic-depressive group was the largest for private hospitals. The second largest group was that of cerebral arteriosclerosis in the state hospitals, the senile group in private and city hospitals, general paresis in veterans' hospitals, and dementia præcox in private hospitals.

When this material concerning first admissions is classified by states in terms of diagnosis either the manic-depressive type or the dementia præcox type was the most common form of psychosis among first admissions. There were a few exceptions to this general rule, however. In New Hampshire and New Jersey psychosis with cerebral arteriosclerosis was the most common form, and, in Nevada, senile psychosis. The proportion of first admissions whose cases were undiagnosed was large in Illinois, Michigan, Mississippi, Louisiana and Colorado, and the proportion without psychosis was large in Vermont, Virginia, North Carolina, Arkansas and Colorado. The large percentage without psychosis is partially accounted for by the fact that some of the hospitals for mental disease have special departments for the treatment of alcoholism. The alcoholic disorders constituted 4.8 per cent of all first admissions, distributed as follows: 4.6 per cent were in state institutions; 4.7 per cent in county and city hospitals; 8.1 per cent in veterans' hospitals; and 5.3 per cent in private hospitals.

News and Notes.

AMERICAN PSYCHOPATHOLOGICAL ASSOCIATION.—The twenty-eighth annual meeting of the American Psychopathological Association will be held in Atlantic City, May 4 and 5, at the Hotel Traymore.

The Association of American Physicians and Surgeons is also meeting during this week at Atlantic City.

Any member of the American Psychopathological Association wishing to present a paper will please send his title to the Secretary, not later than April 1. The subjects to be especially considered this year are insulin therapy, anoxemia, reflex epilepsy and sex crimes; titles need not necessarily be limited to these topics however.

Accommodation at Atlantic City may be had at the Hotel Traymore for $4 for single rooms and $6 for double rooms.

Communications relative to this meeting may be addressed to the Secretary, Dr. L. E. Emerson, 370 Commonwealth Ave., Boston, Mass.

THE JOURNAL OF NEUROPHYSIOLOGY.—Announcement has been made of the publication of a new scientific periodical, the *Journal of Neurophysiology*, the first issue of which is dated January 1938. The scope of the *Journal of Neurophysiology* as stated in the prospectus is intended "to provide a channel for prompt publication of original work bearing on the functions of the nervous system, peripheral and central. It has been planned to embrace all aspects of the subject amenable to experimental analysis; it will not include morphology for its own sake nor neuropathology, and only those clinical, psychological or zoological contributions will be considered which are primarily experimental in character."

The January issue of the *Journal of Neurophysiology* includes articles by:

Fenn, W. O.: The Potassium and Water Contents of Cat Nerves as Affected by Stimulation.

Young, Allan C.: The Effect of Stimulation on the Potassium Content of Limulus Leg Nerves.

Sugar, Oscar: The Non-Centrifugal Degeneration of Severed Peripheral Nerve.

Walker, A. Earl: An Oscillographic Study of the Cerebello-Cerebral Relationships.

Davis, H., Davis, P. A., Loomis, A. L., Harvey, E. N., and Hobart, G.: Human Brain Potentials During the Onset of Sleep.

Magoun, H. W., and Ranson, S. W.: The Behavior of Cats Following Bilateral Removal of the Rostral Portion of the Cerebral Hemispheres.

Kennard, Margaret A., and Ectors, Leon: Forced Circling Movements in Monkeys Following Lesions of the Frontal Lobes.

Dusser de Barenne, J. G., and McCulloch, W. S.: Functional Organization in the Sensory Cortex of the Monkey (*Macaca mulatta*).

Smith, Wilbur K.: The Representation of Respiratory Movements in the Cerebral Cortex.

The *Journal* will be issued bi-monthly, each number containing approximately 100 pages; the price is $6.00 in the United States, Canada and Latin America, $6.50 in other countries for the annual volume. The editorial office is at the Institute for Human Relations, 333 Cedar Street, New Haven, Conn.

Members of the editorial board are: J. G. Dusser de Barenns, J. F. Fulton, R. W. Gerard; in addition there is an international advisory board consisting of 25 members.

SALMON MEMORIAL LECTURES.—The Salmon Committee on Psychiatry and Mental Hygiene announces the sixth series of Thomas William Salmon Memorial Lectures to be given by Dr. David Kennedy Henderson, Physician Superintendent of the Royal Edinburgh Hospital for Mental Disorders, Scotland, on Monday, Tuesday and Wednesday evenings, April 18, 19 and 20, 1938, at 8.30 p. m. at the New York Academy of Medicine, 2 East 103rd Street, New York City.

Dr. Henderson will speak on: Psychopathic states considered from the viewpoint of:

1. Their place in psychiatry.
2. Their characteristics as evidenced by (a) aggression, (b) inadequacy, (c) creativeness.
3. Their understanding and synthesis.

Dr. Henderson is professor of psychiatry at the University of Edinburgh and is well-known as a consultant and lecturer. He was a major in the World War and the author of several papers on the war psychoses. He holds the degrees of F. R. C. P. (Edinburgh)

and F. R. C. P. & S. (Glasgow). He is the author of numerous publications on psychiatric subjects, and co-author with Dr. R. D. Gillespie of a widely used textbook of psychiatry.

THIRD INTERNATIONAL GOITER CONFERENCE.—The American Association for the Study of Goiter announces that the Third International Goiter Conference is to convene in the city of Washington, District of Columbia, U. S. A., September 12 to 14, 1938.

Physicians and others in the United States and in other countries desirous of participating in the program are requested to submit titles at their earliest convenience. Since the time which it is possible to allocate on the program is obviously limited, it will be necessary for the Program Committee to exercise its best judgment in the selection of speakers and to insist without exception that the speakers conform to the time allocated.

Manuscripts of addresses, papers and discussions delivered or read at the meetings are to be published *in extenso* in the form of transactions.

The official language of the Conference shall be English. Interpreters will be furnished for papers read in other languages.

For further information concerning the Conference, communicate with the officers of The American Association for the Study of Goiter (President, Frank H. Lahey, M. D., Boston, Mass.; Corresponding Secretary, W. Blair Mosser, M. D., Kane, Pa.) or the Chairman of the Program Committee (Allen Graham, M. D., 2020 E. 93d. St., Cleveland, Ohio).

OUTLINE OF TENTATIVE PROGRAM.

First Day—Subject: Endemic Goiter, Cretinism, and Myxedema:

Etiology.	Iodine.
Pathology.	Prophylaxis.
Types.	Thyroiditis.
Geographic distribution.	Malignant goiter.

Second Day—Subject: The Thyroid in relation to Metabolism, Nutrition and Endocrine Glands. Physiological and Pathological Interrelationship and Clinical Application:

Oxidation.	Parathyroid.
Sugar metabolism.	Pituitary.
Water balance.	Adrenals.

Third Day—Subject: Hyperthyroidism:

Basal metabolism.	Types:
Iodine.	Diffuse toxic goiter.
Complications.	Nodular toxic goiter.
Recurrences.	Treatment:
Goiter heart.	Nonsurgical.
	Surgical.

The subdivisions under the subjects above are for illustrative purposes only and are not to be considered as all inclusive or exclusive.

AWARD TO DR. WAGNER-JAUREGG.—The Committee on Research in Syphilis, New York City, organized in 1928 to subsidize and develop clinical and laboratory research, has made to Professor Julius Wagner-Jauregg, of Vienna, an award of $1000 together with a medal in recognition of his work on malaria therapy. This work was the basis of the Nobel prize which was awarded to Professor Wagner-Jauregg in 1927.

THE AMERICAN ASSOCIATION ON MENTAL DEFICIENCY.—The 62nd annual meeting of the Association will be held at the Hotel Jefferson, Richmond, Virginia, April 20 to 23, 1938.

DR. OVERHOLSER APPOINTED TO GEORGE WASHINGTON UNIVERSITY.—Dean Earl B. McKinley, of the School of Medicine, George Washington University, has announced the appointment of Dr. Winfred Overholser, superintendent of St. Elizabeth's Hospital, Washington, D. C., as professor of psychiatry and head of this department at George Washington University. This announcement was made on the occasion of the Smith-Reed-Russell lecture at the School of Medicine on February 24, which was delivered by Dr. Overholser, after which Dean McKinley gave a luncheon in his honor at the Cosmos Club.

Dr. Overholser succeeds the late Dr. William A. White as professor of psychiatry at the George Washington University, and will assume the duties of this position at the beginning of the 1938-39 academic session.

ESP CARDS.—Following publication in the January number of the JOURNAL of Dr. Wolfle's review of work on Extra-Sensory Perception and Dr. Rhine's comments upon this review, the following note has been received from Dr. Wolfle.

It is now generally recognized that the commercially-produced ESP cards are faulty in that they may be read from the backs. Dr. Rhine has denied (AMERICAN JOURNAL OF PSYCHIATRY, 94:960, January 1938) that similar defects are to be found in the hand-stamped cards used in the earlier ESP work. Hand-stamped decks sent sometime ago by Dr. Rhine to the University of Minnesota and to Northwestern University have been examined. Dr. Skinner, of the University of Minnesota, has written me that the rectangles of the deck sent there can be read from the back. I found it possible to make scores of 20 to 24 with the deck sent to Northwestern University by using the warpings as visual cues. The clearness of the warping varies from card to card and probably from deck to deck, but the fact that the only two decks which I know to have been examined by unsympathetic eyes show obvious sensory cues suggests the possibility that similar cues existed on the cards which were used at Duke University.

Book Reviews.

DISEASES OF THE NERVOUS SYSTEM IN INFANCY, CHILDHOOD AND ADOLESCENCE. By *Frank R. Ford, M. D.* (Springfield, Ill., Baltimore: Charles G. Thomas, 1937.)

This is a textbook compiled by a recognized authority in the field of nervous diseases in children. The neurology of childhood is still in an early stage of development, for even the common neurological disorders of this period are to a certain extent obscure. The author of this book has brought together all the available information about these conditions in an effort to clarify in part at least, the present situation.

In Chapter II, under the heading of "Clinical Aspects of the Anatomy and Physiology of the Nervous System," an outline of these subjects is presented with emphasis upon certain aspects which are of clinical importance. At birth the anatomical development is far from complete. Myelinization of recognized nerve tracts continues into the second year of life. There is a close parallelism between myelinization of the nervous system and the development of its physiological activities. It can be assumed that full functional activity cannot appear before anatomical maturity is attained although apparently immature structures may react to a limited degree. There is a lack of cerebral function in the newborn as expressed by the absence of true volitional activity and lack of inhibition of the segmental apparatus. A brief description of certain reactions which are peculiar to this age is presented, followed by a sketch of the successive stages by which the simple reflex activities of the infant become elaborated into the highly integrated reactions of the adult. An outline is presented of the signs and symptoms upon which one relies in reaching a conclusion as to the site and extent of a lesion or lesions involving the nervous system.

Included in the book are all the conditions which occur in childhood, not merely those which are peculiar to childhood. The neurological complications of diseases not primarily neurological are also given with a brief discussion of the general aspects of the disease.

In contrast to the purely anatomical classification of the diseases of the nervous system, a pleasing change has been introduced. In this book the grouping of diseases has been based primarily upon etiology with due regard to clinical characteristics. The clinical description of each condition is presented with a brief discussion of pathological anatomy, diagnosis, prognosis and established principles of treatment. Appended to the description of each disease is a short bibliography. In compiling the bibliography care has been taken to select those references which have been written in English and will be found to be most easily available.

In the concluding chapter will be found a short discussion of neurological syndromes and symptom groups. It has not been the purpose of the author

to present a complete differential diagnosis. He has discussed the more common groups of physical signs which appear in relation to the various conditions which may produce them. Spastic paralysis, muscular atrophies, ataxia and disorders of speech function are a few of the symptom groups discussed.

Throughout the book the author has drawn as far as possible on personal experience. Where this has been inadequate, he has presented descriptions which have been based upon a consensus of opinion of recognized authorities. The book is profusely illustrated, and in it are included many case histories, which help greatly in emphasizing particular features.

This textbook will be found to be a most valuable aid to the medical student, neurologist and pediatrician.

W. W. Barraclough, M. D.,
University of Toronto.

Psychiatric Social Service in a Children's Hospital. By *Ruth M. Gartland.* (Chicago: The University of Chicago Press, 1937.)

This monograph will be of interest not only to those in the very specialized field described, but to anyone who is doing psychiatric social work with children, for much of it deals with the fundamental concepts of case work treatment. It describes the work done by the Children's Psychiatric Clinic in the Bobs Roberts Hospital of the University of Chicago Clinics during its first two years, when the author was in charge of the social work there and Dr. Herbert Chamberlain was in charge of the psychiatry.

The first part of the book, which deals with the organization of the clinic, will not be of such general interest. The usual organization of Child Guidance Clinics was followed. The only difference seemed to be in the way the pediatrician was brought into the teaching part of the program. The way this teaching function has been carried out in all such clinics has varied greatly and seems to have depended on the interests and personalities of the staff. We gather from the book that most of the clinical contacts with pediatricians were handled by the social worker, and we wonder if the pediatrician would accept teaching from a social worker as readily as from a psychiatrist.

In one chapter she emphasizes the need of centering attention on the concerns of the parents. In another types of service rendered are discussed. It was found inadvisable to insist that every patient follow the usual routine of examination. For example: "if the patient is a shy or retarded child who is failing in school, testing should not be the first step in treatment." It was found that a partial study sufficed in quite a few cases.

The following comment on work with the schools illustrates the type of material found in the book:

"In work with the schools it has been evident that teachers are truly mother substitutes, not only in the child's projection upon them of this rôle, but also in their own feelings and attitudes. We have succeeded in changing their attitudes toward the child only when we have eased their anxieties and utilized the positives in their relationship with the child. When workers have

been too intent upon problems, have emphasized what needed to be righted, they have been a nuisance to the teacher (because they added to her anxieties) and have caused the child to be a nuisance to her because he was a problem and therefore to be over-protected or rejected by her."

The author found it difficult to use student social workers on any but the simpler cases, and then found that only the emotionally more mature and understanding students could be of any help. The simpler cases were the ones in which the parents were emotionally able to take advice on an intellectual basis. It was found that a number of this type come to a psychiatric clinic in a children's hospital; whereas, we understand, the more isolated clinic has very few of these among its clients.

A detailed study of a case is given to show "Changing Treatment Trends." She emphasizes the necessity of the social worker giving up her own desires in treatment in order to meet the patient's felt needs. It shows the method by which one social worker succeeded in getting to the core of a mother's problem and helping her to accept her child as she is, while another failed.

In conclusion the author points out the strategic position a psychiatric clinic attached to a pediatric department holds in the community, because of the large group it is able to reach in the pre-school years, and the ease with which refers to the clinic are accepted by parents.

BARBARA J. ASHENDEN,
Children's Psychiatric Clinic,
The Johns Hopkins Hospital.

AUTISTIC GESTURES: AN EXPERIMENTAL STUDY IN SYMBOLIC MOVEMENT. By *Maurice H. Krout*. Psychological Monographs, Vol. XLVI, No. 4. (Princeton: Psychological Review Company, 1935.)

Clinical consultants of any experience learn to observe the "unconscious" gestures of their patients as closely as their verbal responses; and it is a familiar fact that we may unwittingly express our inner reaction to a suggestion by a slight bodily movement even while we are denying it in words. But observations in this field are likely to be impressionistic and unsystematized, and the value of Professor Krout's publications in the past seven years lies in their contribution towards making such observation analytical and explicit.

The series of studies reported in this volume represents an attempt to investigate "autistic gestures" under controlled conditions; autistic gestures being defined as those explicit bodily movements which occur when an individual inhibits his direct response to an external stimulus. The theory accepted by the author is that, in the presence of conflict and blockage, there may be an escape of impulses into effector-systems, which, were the impulses uninhibited, would provide normal outlets for them. An obvious criticism is that the gestures may equally well be responses to *internal* stimuli, and bear no relation to the external stimuli preceding them; this probably accounts for some of the inconsistent results obtained.

Krout's approach is an empirical one, his original materials being gathered from the careful observation of subjects during a classroom period, and the words immediately preceding each movement being also noted, on the assumption (not necessarily valid) that they had called forth the gestures. This provided a list of 340 distinguishable gestures, which appears in the appendix; though not, of course, exhaustive, this list is one of the many interesting features of the study.

The experimental studies then undertaken were aimed at elucidating the relationship between certain of these gestures and the verbal stimuli preceding them, at determining how consistent the bodily movements were under similar conditions, and, in certain cases, at discovering the "complexes" responsible for the inhibition of direct response. The problem is a difficult one and the results are not always clear-cut; but the symbolic nature of these movements is in many cases quite apparent.

One of the most interesting experiments was carried out upon a hypnotized subject, who duplicated exactly the gestures which he had made in response to the same stimuli before being hypnotized. The general consistency of autistic gestures in response to identical stimuli seems, on the whole, to be fairly well established—provided, of course, that the conflict remains. Two case studies of individuals are presented, in which the gestures aroused by certain stimuli are plausibly interpreted in relation to conflicts actually existing.

The monograph is not particularly easy reading, but the concepts used are clearly defined, and the study deserves the careful attention of any who have become interested in the "language of the body." There is a bibliography of 50 titles, and previous work on the subject is critically reviewed.

J. D. Ketchum, M. A.,
University of Toronto.

Psychoanalysis Explained. By *Dorothy R. Blitzsten.* (New York: Coward-McCann, 1936; London: Allen and Unwin, 1937.)

In Dr. A. A. Brill's preface to this 66-page book, he states, "I feel that the author is to be congratulated on having performed a difficult task. I am sure that the book will be of great interest and enlightenment to all seekers of the truth about Freud's psychoanalysis." As the daughter of a distinguished physician, the wife of a distinguished psychoanalyst, herself formerly a student of medicine and now a graduate student in sociology, as a young matron of wide acquaintance, Mrs. Blitzsten has encountered a great variety of inquiries—and of misunderstandings and misconceptions—about psychoanalysis. She prepared this book as an outcome. Her chapter headings are: Why Be Analyzed; How Psychoanalysis Works; How It Is Done; Who Is the Analyst; and Whence Comes Psychoanalysis.

This book is not a "popularization" of psychoanalysis. It is a notably successful primer for distribution by psychiatrists and others to people who want an elementary but authoritative statement about the therapeutic procedures which have been evolved on the basis of the work of Sigmund Freud.

H. S. S.

THE EXPLORATION OF THE INNER WORLD. By *Anton T. Boisen.* (New York; Chicago: Willett Clark & Company, 1936.)

This work is described as a study of mental disorder and religious experience. The Rev. Anton T. Boisen is chaplain at the Elgin (Ill.) State Hospital and lecturer at the Chicago Theological Seminary.

This book represents obviously an honest record of the experience of the author, a Protestant clergyman, who had himself experienced a mental illness necessitating hospital treatment, and who subsequently worked as a research student, chaplain and instructor of theological students in psychiatric clinics and hospitals, more particularly Worcester (Mass.) State Hospital. The danger in attempting to make such a record as is represented in this book is that one's own personal experience in the realm of mental disorder and one's own interpretation of that experience, may be sufficiently personal and possibly faulty, as to give wrong emphasis in interpreting the meanings and significance of mental disorders as we find them in special hospitals, clinics and in the community, *e. g.,* the author's explanations of the basis for his developmental mental conflict and his explanation as to his recovery from mental disorder, are open to very definite question by the psychiatrist; and it is on the basis of such experience and such interpretation that the author has approached the study of mental disorder and the relationships of such disorder to religious experience.

One aspect of Mr. Boisen's work which is especially worthy of commendation is his project for bringing the theological student into intimate working contact with mental hospital patients and their life experiences. One would think that this type of training and also contact with individuals who are failing in their community relationships, are essential in the education of the clerical student.

Part 1 of this book purports to represent a survey of the fields of mental illness and of religious experience. The survey of mental illness is incomplete and attempted on so narrow a basis as to make it unsatisfying to the psychiatrist. The reviewer also suggests that there are many religious experiences much more closely related to reality than the emotional experiences reported in this section as religious experiences and occurring in relationship to severe states of mental dissociation.

In Part 2, dealing with theoretical implications, the reviewer would agree that if one accepts the author's definition, namely that "religion has to do with the organization of personal and social experience" and accepts the implication that religion is such understanding and organization of experience leading to a philosophy compatible with realities of living, then religion does play an extremely important part in personality adjustment and healthy living. Unfortunately such organization and the resulting philosophy of living may be so faulty and incompatible with reality as to result in disastrous disorganization of personality. The reviewer would suggest that in this particular approach to the problems of mental disorder, the psychiatrist, with broad contacts with individuals and with a consequent respect for the effects of "organization of experience" on the total process of growth

and integration, is on reasonably common ground and in agreement with the author.

In Part 3, dealing with practical applications, there is no doubt that there is a basis for a common effort for the psychiatrist and the clergyman in the field of mental growth and mental health. This might, however, equally be said for the psychiatrist and the teacher, and for the psychiatrist and the internist. The danger of clerical psychotherapy would seem to lie in the tendency to uncritical acceptance and use, on the part of the clergy, of particular psychotherapeutic theories and formulations which they are not prepared to adequately evaluate. At the same time we must in fairness face the fact that there has been an equally uncritical acceptance and easy conversion to certain psychotherapeutic theories and practices in a large active psychiatric group.

While one does take exception to certain conclusions of the author, this book, if it helps to clarify a cooperative working relationship for the clergyman and the physician, in the field of personality adjustment, does represent a worthwhile contribution.

The reviewer recommends it for critical reading to the psychiatrist and the clergy—the psychiatrist to remember that it is an "exploration" undertaken on the basis of a background of experience, non-medical in character, and the clergyman with the caution that one cannot, in dealing with human individual responses, see spiritual as apart from other life values.

W. T. B. Mitchell, M. D.,
Mental Hygiene Institute, Montreal.

Why We Do It. By *Edward C. Mason, M. D., Ph. D.* (St. Louis: C. V. Mosby Co., 1937.)

This book appears to be a sort of primer of abnormal psychology for the lay reader, which it is hoped may aid "some parent in adjusting his child to his environment," or "prompt some individual to seek the aid of a psychiatrist before filing suit for divorce."

The author is professor of physiology, University of Oklahoma School of Medicine. Referring to man's attempts to interpret his superiority by the sequence of concepts of *soul, mind, consciousness,* he suggests "It now becomes humorous when we realize that *psychology has surrendered its soul to theology, has lost its mind to metaphysics, has been knocked unconscious by science, and has now come to physiology to interpret its behavior.* With this transition, the term psychology has lost its significance and probably should be discarded. In its place one might substitute 'behaviorology' or a study of behavior."

"Personality," he states, "represents the sum total of all one has with which to meet the problems of life; it includes height, weight, sex, education, halitosis, dandruff, the emotions, and all those qualities which make for success or failure of the individual." To simplify a complicated matter the author resorts to the common expedient of an elaborate diagram which purports to represent brain mechanisms, but which does not seem calculated to shed much light on the pathway of the lay reader.

This is not to say that the primer does not contain here and there some good sense and wisdom. The author gives brief statements, somewhat oversimplified, of the development of the personality and of the functions of the endocrines and the autonomic nervous system. He then sets forth the hypothetical psychology of the religious fanatic; passes on to the discussion of sex, social development, education and environment.

Having disposed of these matters there is presented an epitome of psychiatry in fifty pages. This includes a discussion of the conventional time-honored symptoms and of various psychotic types.

In an amazing chapter he gives "some characteristic differences between the insane and the sane." Referring to delusions as "the most common, the most evident, and the most resistant characteristic of the insane," the author informs us that "these delusions give rise to exaggerated emotional responses in the form of extreme exaltation or extreme depression. The most superficial examination reveals the fact that the insane's (*sic!*) belief has no logical reason for its existence, and that his hallucinations [which had not thus far been mentioned] are not a product of reality." In this neat differentiation between the "insane and the sane" the author has observed one other criterion, "another attribute quite constantly found in the insane is 'unsociability' "which he regards as a "rather characteristic expression of insanity."

In seven pages the author epitomises the treatment of mental disease including mental hygiene and prophylaxis. He states that "most if not all abnormal psychology has its origin in faulty childhood training or treatment." It is comforting to have the author tell us that approximately 80 per cent of mental cases can be cured "by the understanding, sympathetic family doctor"; and that only 20 per cent require the services of a psychiatrist; but particularly that only approximately 2 per cent of all cases require institutional care. Psychotherapy is disposed of in three pages. It consists of *exploration, free association, transference* and *adjustment.*

In 176 pages the author has skimmed blithely over an enormous terrain. The conclusion the reviewer is left with can be expressed as a variant of the title of this book—Why did he do it?

C. B. F.

In Memoriam.

HENRY H. DONALDSON.

1857-1938.

Dr. Henry H. Donaldson was born in Yonkers, N. Y., in 1857 and died January 23, 1938. The inclusiveness of his interests was shown by his receiving the degree of A. B. from Yale in 1879, of Sc. D. from Columbia in 1881, and a Ph. D. from Johns Hopkins in 1885. After teaching biology and then psychology at Johns Hopkins, and then neurology at Clarke University, he became head of the Department of Neurology at the University of Chicago. For 38 continuous years until his death he was professor of neurology at the Wistar Institute of Philadelphia. He was president of the Association of American Anatomists from 1916 to 1918.

Dr. Donaldson was a great man, a most remarkably beautiful personality. His outstanding intellect found in science not only cold facts and theory, but the inspiration for a profound philosophy. Science was to him a religious experience in somewhat the Spinozian sense. This acute consciousness of beauty in the laws of nature made him intensely careful in his observations and deductions. This gave him an outstanding scientific honesty. Each observation and theoretical deduction was carefully analyzed and considered from all angles.

He inspired those who were fortunate to work under his supervision with a profound appreciation of the value of scientific truth. Because of this same factor he never hesitated to change any theoretical deduction when new facts were revealed. It also enabled him to spend many years in the most difficult type of work, obtaining innumerable data in order to standardize the albino rat, so that others might have less difficulty in obtaining scientific truths through the utilization of this animal. The standardization of the Wistar Albino Rat is of inestimable value to scientists throughout the world.

He had a special interest in the nervous system. Only his pupils probably realize the great extent of his knowledge of all aspects of

the nervous system, for Dr. Donaldson never cared to write semi-popular treatises in this field, despite the request of some of the former neurologists of Philadelphia. However, the American Neurological Association recognized his great contributions to American neurology in electing him as president of the American Neurological Society in 1937; The American Psychiatric Association invited him to give its annual address in 1932. His major interest with reference to the nervous system was the growth of the central nervous system, as well as the study of the brain in outstanding scholars. As a result of the latter study he stressed the significance of the vascular supply in the brains of scholars.

His great pride and joy was in the direction of young men in some research project on the nervous system. He always followed up this interest after the men left his laboratory and nothing gave him more pleasure than to learn of their progress and success. This great kindliness was probably motivated by his desire that others would be inspired to get on along that very hard road seeking scientific truths. "To know him was to love him."

JOHN CHORNYAK.
EARL D. BOND.

PARESIS.

An Analysis of Five Hundred and Eleven Treated Cases.*

By ROBERT A. MATTHEWS, M. D., Philadelphia, Pa.
ROBERT S. BOOKHAMMER, M. D., Norristown, Pa.
AND
WILLIAM H. IZLAR,† M. D., Miami, Fla.

Paresis is no longer a disease with a uniformly unfavorable prognosis. In the past 15 years the treatment has been revolutionized, first, by the introduction of malarial therapy by Wagner von Jauregg, which recently in some quarters has given way to other forms of fever treatment and, secondly, by the development of the penta-valent arsenical, tryparsamide. Although the incidence is decreasing according to Malzberg,[1] the morbidity and mortality of the disease is still alarmingly high. In small groups of selected cases in which treatment was begun soon after the onset of symptoms, the reported recovery rates are encouraging. This indicates the need for very early clinical and serological diagnosis. Our goal should be prevention rather than cure, first by the prevention of syphilis, and second by the proper follow-up of all cases of known syphilis by means of repeated serologic studies of the spinal fluid. Thus, early involvement of the central nervous system can be detected and proper treatment instituted before clinical symptoms appear. In this regard Stokes [2] states "a return to a strongly positive blood after a series of negatives in either early or latent syphilis, is a serious warning. One should at once examine the spinal fluid and incidentally inspect the skin, feel for the liver and spleen, and look at the iris and sclera."

Modern treatment does, however, offer much in a fair percentage of advanced cases as evidenced by striking improvement and even complete remission in patients who outwardly appear to have passed the reversible point and according to all signs show mental deterioration. Unfortunately we do not have very accurate criteria

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

† By invitation.

on which to base a decision as to whether or not an individual patient is likely to be benefited by treatment. For this reason we are hardly justified in withholding treatment in any given case because of the apparent uselessness or because of economic factors.

Material.

All of the patients in our series of cases were treated at the Philadelphia Hospital for Mental Diseases between April 1, 1930, and April 1, 1934, and comprise 511 cases in all. No less than one year elapsed between the time treatment was started and the results evaluated in any given case and in most cases the period was a longer one. Patients received at the Philadelphia Hospital for Mental Diseases are, with few exceptions, committed to the institution from the psychopathic division of the Philadelphia General Hospital. Fever therapy, if deemed advisable, is carried out before commitment. Advanced cases are committed soon after admission to the psychopathic division while the more favorable cases are held for further observation and treatment. Many patients improve sufficiently to permit their discharge from the Philadelphia General Hospital without being committed so that cases received at the Philadelphia Hospital for Mental Diseases constitute a group in which the disease has reached a fairly advanced stage and in which the prognosis for remission or marked improvement is poor. About one-half of our patients had received some form of fever therapy while the other half had had very little treatment directed specifically against paresis. Before treatment was instituted ophthalmological studies were made in all cases. The presence of optic atrophy was considered a contraindication to the use of tryparsamide and such cases have not been included in this series.

Treatment.

The treatment consisted for the most part of tryparsamide alone or in combination with some form of bismuth. Except in cases with suspicious optic nerve changes in which smaller doses were given for the first two or three weeks, the drug was administered intravenously in 3 gm. doses at weekly intervals. For approximately two years we gave a series of 10 injections followed by a rest period lasting four weeks, then a second series of 10 treatments,

followed by an eight-week rest period, and so on, lengthening the rest period four weeks between each series of treatments. Later weekly doses were given without interruption up to 50 doses unless other factors precluded continuing treatment. As to the relative merits of these two methods we have no figures to indicate any advantage of the one over the other. It seems wiser to give the greatest amount of drug in the shortest period of time due to the difficulty experienced in convincing patients of the need for prolonged treatment. In some cases bismuth was administered between the courses of tryparsamide or along with it. After a time we came to regard this as an essential part of the treatment although our statistics do not show clearly whether or not the use of bismuth increased the percentage of satisfactory remissions.

Technic.

In order to lower the dosage cost and because of the number of patients under treatment, tryparsamide was purchased in 50 gm. bottles. The 50 gm. was dissolved in 170 cc. of distilled water, and given in 10 cc. doses. The drug was injected without regard for speed, and in no instances did we produce a speed shock because of the rapidity of the injection. We were able to treat 50 to 65 patients in 45 to 60 minutes. In only two instances did we have to resort to the administration of the drug intramuscularly. In one of the cases so treated abscesses formed at the site of the injection.

TABLE 1.

General Statistical Table.

Patients.	Male.	Female.	Total.
Number treated	405	106	511
Deaths	151	23	174 *
Paroled or discharged	99	15	114
Transferred to other hospitals	34	00	34
Still in hospital	121	68	189

* 83 deaths occurred before 10 doses of tryparsamide were given.

From this table it will be seen that the ratio of females to males is approximately one to four. The ratio of female deaths to male deaths is one to six which gives the females the lower mortality

rate. On the other hand the ratio in the parole rates is distinctly in favor of the men. The group of 189 patients listed as still in the hospital of course constitutes a rather heavy financial burden on the community and may continue to do so for some time, although statistically offset by the rehabilitated group. Furthermore, many of the patients who have improved are the best workers in the institution and practically earn their maintenance in various capacities in the wards and on the grounds. Since adequate treatment has been available, we see fewer patients with broken down skin lesions taking up beds in the infirmary wards and requiring much nursing and individual care. Modern treatment has almost eliminated this type of case. We have indicated in Table 1 that 69 male patients and 14 female patients, 83 in all, died before receiving at least 10 doses of tryparsamide (30 gm.). This we feel significantly lowers our figures for satisfactory remissions and if this group was eliminated our results would appear much better. There would be some justification for eliminating this group of patients since we seldom observe much real improvement in response to tryparsamide before the first 8 or 10 doses have been given. It is hardly fair to judge the value of a form of treatment if the patient does not live long enough to have time to benefit from it or is almost moribund when the treatment is begun. Nevertheless, we are interested in giving as complete as possible a picture of the problem at hand and have listed every patient who received any treatment at all regardless of the amount.

TABLE 2.

	Remissions.		Much improved.		Improved.		Unimproved.		Deaths.	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male	57	14.0	40	9.9	54	13.3	103	25.4	151	37.2
Female	11	10.4	19	17.9	19	17.9	34	32.0	23	21.7
Total	68	13.3	59	11.3	73	14.3	137	27.0	174	34.0

We have divided the cases treated into five groups according to the clinical results observed at the end of at least one year after the institution of treatment.

Those listed as having had remissions were the patients who recovered sufficiently to enable them to leave the hospital, resume

their former place in society, and become economically adjusted on a level similar to that enjoyed prior to the onset of the illness. Some of these patients carried with them a few residual neurological signs. A serological reversal was not considered necessary for inclusion in the group, although desirable. A few of these patients have a slight sense of well being as the only mental symptom.

The patients considered as being much improved were those in good physical condition, and mentally capable of getting along with some supervision either in or outside of the hospital. Some intellectual impairment, probably permanent, is present in all of these cases and they may not be entirely free from other mental symptoms, but in all events they are much better than at the time of admission and the progress of the disease appears to have been arrested.

The cases considered improved were those in whom treatment seems to have benefited both the mental and physical condition to a notable degree, and may have arrested the disease process but improvement was not sufficient to warrant an optimistic attitude as to the future.

The unimproved cases were those in whom no favorable response to treatment had been observed and in which the condition has remained stationary or took a downward course.

In a few cases we felt that active treatment may have hastened death. On the contrary a number of those who seemed almost moribund at the time of treatment was started showed a remarkable response to treatment, and one or two of this group eventually had a complete remission.

An example of such a case is that of a 40-year-old white male, who, prior to admission to the hospital, had received malarial therapy and various antiluetic drugs, with the exception of tryparsamide. He appeared to be utterly demented, was incontinent and almost helpless. We were reluctant to start treatment because the outlook seemed so hopeless, and did so only upon the demand of his wife. After four 3 gm. doses of tryparsamide he began to improve, became tidy and was transferred to a better ward. After seven treatments he was usefully employed in the ward and was sufficiently clear mentally to refuse to sign a legal document which would not have been to his best interests. After 11 treatments he was paroled in excellent condition. Three months later he visited

the hospital driving his own automobile. He was then employed as a furniture salesman in a large department store. He continued treatment for a year and was then lost sight of for a time. Five years later this man showed up at the hospital one day and asked if we could use our influence to have him relieved of jury duty since to serve would entail a financial sacrifice. He was employed at his old trade of toolmaker earning eight dollars a day. He had not had any treatment in the previous four years but was in excellent physical condition and mentally well except for a slight expansiveness.

Table 3 indicates that most of the patients on parole have gained

TABLE 3.

PATIENTS ON PAROLE OR DISCHARGED.

	Male.	Female.	Total.
Remission	52	5	57
Much improved	29	4	33
Improved	11	5	16
Unimproved	7	1	8
Total	99	15	114

either a complete remission or are much improved and that few patients are removed from the hospital who have not improved.

It will be seen by Table 4 that a small number of patients having

TABLE 4.

PATIENTS STILL IN HOSPITAL.

	Male.	Female.	Total.
Remission	3	6	9
Much improved	5	15	20
Improved	34	14	48
Unimproved	79	33	112
Total	121	68	189

a complete remission are still hospitalized. This is largely due to the economic situation. Although these patients are well enough to leave the hospital and capable of becoming economically self-supporting, we were unable to secure employment for them or find

someone to give them financial aid. Had they been discharged arbitrarily they would have become relief clients. The expense to the community would have been much the same and the environmental factors less favorable to a continued state of good physical and mental health.

Analysis of Material.

An attempt was made to analyze more closely the material available in each of the above groups, in order to evaluate if possible the effect of various factors on the expected outcome. Some of the factors taken into consideration were age, race, previous treatment (particularly fever therapy), type of mental reaction at beginning of illness, serologic changes, weight changes and finally complications.

In the majority of the cases, we were unable to obtain accurate data as to the duration of symptoms prior to admission; nor could we determine the time that had elapsed between the initial lesion and the development of symptoms except in a small number of patients. A large number of men denied, apparently truthfully, any knowledge of how or when they contracted syphilis. In only three cases were we able to elicit a history of secondary syphilis.

We have divided our patients according to mental reaction types somewhat differently than did Cheney [3] in his report of the compiled statistics of the New York State Hospital group. We are not quite certain as to what patients should be included in his agitated type, since agitation is a symptom so commonly observed in most organic reaction types and usually is accompanied by more noteworthy symptoms. We do not feel that the site or even the extent of invasion of the organism, except as it eventually leads toward dementia, has much to do with the mental reaction type likely to be manifested although the opposite view appears to be held by Nicol and Hutton.[4] It is our belief that the previous personality type is of much greater importance in determining the mental symptomatology. An example is a patient who developed a schizophrenic reaction type of psychosis (with echolalia and echopraxia) in 1913. He was then hospitalized for three years, recovered, and was discharged. Following discharge he was able to make a satisfactory adjustment both social and economic until 1930 when he

developed symptoms similar to those previously observed. This time it was found that he had developed paresis which had a fatal termination.

Most patients receiving tryparsamide gain weight but there is often no parallel mental improvement.

TABLE 5.

REMISSIONS.

	Males.	Females.
Number	57	11
Median age on admission	40	36
Average age on admission	40	35
Color:		
White	43	6
Black	13	5
Red	1	..
Type of mental reaction on admission:		
1. Simple personality change	12	2
2. Grandiose and exalted	10	2
3. Manic	13	3
4. Depressed	5	2
5. Schizophrenic	1	0
6. Demented	16	2
Weight:		
Lost (maximum 7½ pounds)	6	0
Gained (maximum 50 pounds)	51	11
Serologic changes:		
Complete reversal	5	1
Incomplete reversal	8	2
No change	17	5
Insufficient data	27	3
Treatment:		
Malaria and tryparsamide	24	6
Typhoid vaccine and tryparsamide	2	2
Diathermy and tryparsamide	2	0
Tryparsamide alone	29	3
Complications:		
Jaundice (after 5 doses tryparsamide)	1	0
Optic atrophy	1	1
Drug reaction	0	1

Comment.—It was found that the median age for male patients achieving a remission was 40 years, for females 36. The bulk of the patients were found to be in the two decades 30 to 50.

In the male remissions less than one-fourth of the patients are colored which is rather striking when compared to the group of patients showing a less favorable response in which the percentage of colored patients is much higher. In the females the number of colored patients more nearly approximated the whites but the total is too small to be of any significance. This tendency of the white patient to show a better response to therapy may be explained on the basis of a number of factors. It is likely that the disease goes unrecognized for a longer time in the negro, and that he does not respond as readily to malaria. In addition to this, the negro evidently does not possess as much resistance to the disease as is found in the white race.

An analysis of the mental reaction types indicates that the best response to treatment may be expected in those patients who show either a manic type of reaction, are grandiose and exalted, or merely manifest a simple personality change. This may be due to the fact that such persons come in conflict with their environment early in the course of the disease, and thus have the benefit of treatment sooner than do those whose symptoms are more gradual in onset. However, the number of patients who seemed demented on admission and who recovered, made it extremely difficult to evaluate the prognosis in any given case and justified the administration of adequate treatment in every instance before giving the case up as hopeless.

We obtained sufficient serological data on about 50 per cent of these cases on which to base an opinion as to changes. There was complete serological reversal, in only six of the 38 cases. In 10 there was an incomplete reversal, while 22 continued to have strongly positive serology in spite of the clinical improvement.

Fifty per cent of the patients had been given some form of fever therapy before commitment without having shown sufficient response to warrant discharge from the psychopathic ward of the Philadelphia General Hospital. It should be said, however, that sufficient time had not elapsed in some of these cases to permit the maximum benefit from the fever treatment. It is interesting to observe that the percentage of patients receiving fever therapy is not much larger in the group with a favorable response than in the groups with a less happy outcome. We are, therefore, inclined to

attribute most of the therapeutic benefit to the tryparsamide which all patients received.

Only four of these patients had complications. One patient developed jaundice after receiving five 3 gm. doses of tryparsamide which cleared up rather rapidly after treatment was suspended. After a rest period of six months the therapy was renewed and 40 more doses of tryparsamide given without a recurrence of the complication. Two cases of optic atrophy occurred, one mild and one severe. The patient who developed the high grade optic atrophy after the fourth dose of tryparsamide, was left with traveling sight only. In this patient and one other who developed optic atrophy forced spinal drainage, according to the technic of Retan, was carried out with no apparent beneficial results as far as eyesight was concerned. The treatment was given three and four times in the two cases respectively. One patient became sensitive to tryparsamide after receiving 129 injections and developed nausea and vomiting following each subsequent treatment.

Comment.—It was found that only half of these patients were classified as to mental reaction type on admission in groups other than demented. Only a few failed to gain weight or lost. Complete serologic reversal was the exception rather than the rule. Complications were not common enough to be alarming, since they were observed in only five cases. Drug reactions in the form of gastric disturbance occurred several times in a patient who had a great deal of treatment. The patient who became jaundiced cleared rapidly when treatment was stopped. The optic atrophy was of mild degree only. One patient developed a very severe aplastic anemia attributed to arsenic poisoning. In this case the red blood cell count dropped to 1,000,000 but increased rapidly when tryparsamide therapy was discontinued and liver was administered by mouth and parenterally. Thirty-five of these patients had previously had malaria.

TABLE 6.

MUCH IMPROVED.

	Males.	Females.
Number	40	19
Median age on admission	38	43
Average age on admission	40	44
Color:		
White	30	14
Black	10	5
Type of mental reaction on admission:		
1. Simple personality change	3	0
2. Grandiose and exalted	10	4
3. Manic	1	1
4. Depressed	5	4
5. Paranoid	1	0
6. Demented	20	10
Weight:		
Lost (maximum 8½ pounds)	4	0
Gained (maximum 55 pounds)	34	19
Stationary	2	0
Serologic changes:		
Complete reversal	4	1
Incomplete reversal	2	1
No change	9	10
Insufficient data	24	5
Treatment:		
Malaria and tryparsamide	27	8
Tryparsamide alone	13	11
Complications:		
Jaundice	1	0
Optic atrophy	1	1
Aplastic anemia	0	1
Drug reaction	1	0

TABLE 7.

IMPROVED.

	Males.	Females.
Number	54	19
Median age on admission	41	40
Average age on admission	39	39
Color:		
White	37	15
Black	17	4
Type of mental reaction on admission:		
1. Simple personality change	0	2
2. Grandiose and exalted	7	5
3. Manic	6	1
4. Depressed	0	1
5. Paranoid	3	0
6. Demented	38	10
Weight:		
Lost (maximum 19 pounds)	8	2
Gained (maximum 43 pounds)	40	17
Stationary	6	0
Serologic changes:		
Complete reversal	6	4
Incomplete reversal	10	1
No change	30	11
Insufficient data	8	3
Treatment:		
Malaria therapy and tryparsamide	25	9
Diathermy and tryparsamide	0	2
Typhoid vaccine and tryparsamide	5	3
Tryparsamide alone	24	5
Complications:		
Drug reaction	0	1
Optic atrophy	3	3
Jaundice	0	1

Comment.—The great majority of these patients appeared to be demented at the time of admission and judging from the lack of response to treatment the disease process must have been fairly well advanced before therapy was made available. There is little about this group of unusual interest or which bears comment, except the massive amount of tryparsamide given one patient who received in all 944 gms. before becoming sensitive to the drug and developing a drug reaction.

TABLE 8.

UNIMPROVED.

	Males.	Females.
Number	103	34
Median age on admission	42	39
Average age on admission	42	37
Color:		
White	57	23
Black	46	11
Type of mental reaction on admission:		
1. Grandiose and exalted	13	7
2. Manic	6	3
3. Depressed	3	3
4. Paranoid	3	0
5. Schizophrenic	1	2
6. Demented	77	19
Weight:		
Lost (maximum 35 pounds)	39	4
Gained (maximum 41 pounds)	55	30
Stationary	9	0
Serologic changes:		
Complete reversal	6	5
Incomplete reversal	14	8
No change	55	10
Insufficient data	28	11
Treatment:		
Malaria and tryparsamide	33	11
Diathermy and tryparsamide	0	1
Typhoid vaccine and tryparsamide	4	2
Tryparsamide alone	66	20
Complications:		
Optic atrophy	10	3
Jaundice	2	0

Comment.—Here the average and median age on admission was greater than in the groups with a more favorable outcome. Three-fourths of these patients appeared demented on admission. A larger percentage did not gain weight. In view of the large number in the group and in spite of the fact that most of these patients remained hospitalized and received treatment over a prolonged time, very few have had serologic reversals. Although cases were selected for treatment on the basis of negative eye

ground findings, optic atrophy developed in 10 per cent of these patients.

TABLE 9.

DEATHS.

	Males.	Females.
Number	151	23
Median age on admission	44	44
Average age on admission	45	46
Color:		
White	87	11
Black	64	12
Duration of hospitalization: less than 1 year	105	18

TABLE 10.

CAUSES OF DEATHS OTHER THAN PARESIS.

Lobar pneumonia	5
Luetic heart disease	2
Highway accident	2
Pneumococci meningitis, carcimona of pancreas, fractured femur, toxic hepatitis (arsenic poisoning), carcimona of cervix, erysipelas and broncho-pneumonia	1 each

Comment.—The median age of the patients who died was 44 years, the highest found in any of the groups. The largest number of deaths occurred in the fifth decade, while only 19 of the 174 patients who died were under 30 or over 60 years of age. An unusual case in this group was that of a 94-year-old Chinaman with characteristic serology and neurological signs who died after three years hospitalization. The high percentage of colored patients who died seems significant since negroes constitute 38 per cent of the entire group but make up 43.6 per cent of the deaths. Over two-thirds of the patients who died (123 in all) did so within the first 12 months after admission. Forty-one died within four years and only 10 were hospitalized longer than four years prior to death. Fifteen patients died of causes other than paresis although this disease was a contributing factor in certain of these cases.

Slightly less than one-third of the patients who died had fever therapy. This figure which is the lowest for any of the groups may

be accounted for by the fact that most of these patients were considered unsuitable for fever treatment because of the advanced stage of the disease, or because of some other definite contraindication. We have no way of knowing how many of these patients might have been saved or even achieved a satisfactory remission had it not been for medical conservatism, although we do not think the number would have been very large.

Juvenile Paresis.

Ten cases of juvenile paresis were included in this study. Due to the small number this has not materially affected the statistics. Four patients improved sufficiently to leave the hospital and of these, three became self-supporting. Of those remaining in the hospital two have shown marked improvement, the others have not been benefited by treatment. We consider these results good in view of the usual poor prognosis in juvenile paresis. One of these patients, a boy age 23 years, presented especially interesting features. He had been treated for syphilis from a very early age, had not done well in school, and about the age of 10 developed ascites secondary to hepatic damage for which he was tapped some 53 times. He had shown mental symptoms for some months prior to admission. With treatment he improved rapidly both physically and mentally. At the time he left the hospital his relatives considered him better than at any time previously. He made a satisfactory social and economic adjustment for three years when he was again hospitalized. Now, at the age of 30, his condition is stationary and characterized by slight emotional and intellectual deterioration.

Conclusions.

1. The results of treatment of 511 patients are reported and analyzed.

2. 13.3 per cent of the patients had a remission; 11.3 per cent were much improved; 14.3 per cent improved; 27 per cent were unimproved, and 34 per cent died.

3. There were 174 deaths in all, 123 of these dying within one year of commitment. Eighty-three, or 47 per cent, died before sufficient treatment could be given.

4. Of the mental reaction types, a manic reaction, a grandiose and exalted state or a simple personality change indicated a more favorable prognosis.

5. Serological reversals occurred in only a small percentage of patients and in no way paralleled the clinical results.

6. Complications occurred in 13 per cent of our cases. The most frequent complication was optic atrophy which developed in 6.8 per cent of the surviving group; in spite of the careful eye ground examinations prior to treatment. However, a severe grade of optic atrophy occurred in only one patient showing an otherwise favorable response to treatment.

7. Because of the frequency with which a favorable outcome is observed in apparently hopeless cases, all paretics should be afforded adequate treatment.

8. Although the treatment of choice in paresis embodies a combination of some form of fever therapy with tryparsamide and bismuth, the results obtained with tryparsamide as the major therapeutic agent in this series closely approaches that obtained with combined treatment.

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DISCUSSION.

Dr. Francis J. Braceland (Pennsylvania Hospital, Philadelphia, Pa.).—The paper is one which does not admit of argument, and little discussion can be given.

Here are the figures and the results, and to differ with Dr. Matthews, one would have to present 511 cases. The point that strikes me is that in contrast to the older idea that all paretics would die within two years, here is a concrete example of the fact that there is no excuse for therapeutic nihilism.

Yesterday we spoke of 37 patients having been admitted to a private hospital over a period of two years, and added that in the last 11 months in our

hospital, which has a population of 210, not one paretic has been admitted. Much treatment is now being carried on in general hospitals.

There are many angles to this paper, if one wanted to get philosophical about it, as Dr. Bowman advised last night. You will remember that Dr. Matthews made a man so well who was apparently manic that he came up and wanted to avoid his duty as a citizen by serving on a jury; also, that he drove to the hospital in an automobile. That might account for some of the men we meet driving automobiles on the street.

Less than one-third of the patients who died had received fever therapy, and 83 patients died before treatment was given, which was 47 per cent, which means that very probably treatment is blamed for some deaths which would have occurred anyhow.

I want particularly to call your attention to the type of patient that was treated by Dr. Matthews. They are patients who have been picked over. Treatment has been given in the Philadelphia General Hospital, and those who apparently have not been helped, or those unsuitable for treatment are then sent to the Philadelphia Hospital for Mental Diseases. Therefore, it represents a group which is apparently hopeless at the outset, and out of 511 patients that these men treated, 114 were materially helped. Therefore, it is an excellent thing, and a good example to us of the younger group that we should not give up too soon, but should attempt to treat these patients to the very last.

I think that the paper is well taken and excellently presented, and I congratulate the author.

Dr. Meyer K. Ampur (Augusta, Ga.).—I would like to mention two points. No. 1, some of the patients that Dr. Matthews mentions considered not improved were sent to another hospital, and a year later were much improved, and soon discharged. I don't believe you included these patients, Dr. Matthews.

Another point is about optic atrophy. I believe we as physicians are mistaken in holding the injection of tryparsamide as responsible for optic atrophy. In state hospitals where it is not given there are a number of patients with optic atrophy. I don't believe optic atrophy is caused by tryparsamide. I believe this idea eliminates the use of it in many cases, and if it would be used, we would have a much larger number of improvements.

ADJUSTMENT AND ITS LIMITS.*

By EUGEN KAHN, M. D., New Haven, Conn.

I resent the word adjustment as it is sometimes used to designate a state in which a person or a group of persons are "adjusted to their environment." I resent this usage of the terms adjustment and adjusted as they express something static, something that would not be submitted to any change, at least for some time. I adhere to the opinion that adjustment is a never-ending process involving the individual as well as the group, putting them at times under considerable stress and strain which may and does again and again go beyond their potentialities and capacities to fit themselves into their situation. If one were to assume that the individual adjust himself to a thing or object or situation that exists now and here in a certain way, he must be mindful of the fact that this very thing or object or situation is likely to change in one way or other as soon or even before the intended adjustment is perfected. This, of course, necessitates a continuation of the adjustive activity or the initiation of a new adjustment or readjustment, and so it goes on.

With the sociologist the psychiatrist has no bone to pick. Both are interested in and studying social or cultural adjustment. It is worthy of note that an outstanding sociologist (A. G. Keller) dealing with societal evolution and adjustment remarks on "experiments which nature performs for the scientific student of human society," and that an outstanding psychiatrist (Adolf Meyer) often uses the term "experiment of nature" when he considers any sort of condition as he just observes it in one of his patients.

In their attempt to get at the roots of adjustment, to explain and to understand it, both sociologists and psychiatrists try to do justice to all possible influences hitting those who are expected to adjust, and in this attempt make every endeavor to do justice to nature as a whole and to "natural science." There is, however, a certain difference between the starting point of the sociologist and

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that of the psychiatrist. The sociologist primarily and essentially is dealing with groups of human beings who are exposed to compelling forces from the outside, and who develop any manner of means to deal with these forces in a "highly automatic and impersonal" way (A. G. Keller). Culture, the medium of ever so many human adjustive processes, is often considered by the sociologist as an impersonal or super-personal force of its own moving groups and moved by them. The psychiatrist on the other side, starts with the individual who comes to him as a patient; he sees, as it were, the situation, and with it the outer influences his patient is exposed to through the eyes of his patient. There is no doubt that despite the difference in their starting points, the sociologist and the psychiatrist often meet in their mutual concern. In not a few instances, their fields of endeavor overlap. Certainly it never did a psychiatrist any damage to make himself somewhat familiar with the science of society, and it gives the psychiatrist great satisfaction to see that many sociologists become increasingly interested in his field.

Looking once more at the point of attack of the sociologist, it is not astounding to find that a number of sociologists in their attempt fully to do justice to nature and her forces, essay to make out of their science a tool similar to any branch of natural science proper, digging into causality, and willfully neglecting anything that one might call motivation. It is not incumbent upon the psychiatrist to scrutinize such an attitude, but he finds himself unable to accept it in his own field, where every day, with all due respect for nature and her causal laws, he stumbles over human experiences which, however much bound to causality they may be, do not perfectly fill the bill of causality, but include the aspiration for goals or ends, show purposefulness, show the desire to move ahead, show a definite personalization of incentives and drives for which we find no better words than reasons and motives. It cannot be denied that if one retrospectively takes account of the evolution and history of groups, it is quite plausible to be primarily impressed with the causal laws, so-called, of nature, and to brush aside the more subtle as fundamentally individual phenomena which are called reasons and motives. This, of course, cannot mean that they do not exist, or that they would not play a very important rôle. After all any group gaining its livelihood in any environment what-

soever and thus being exposed very impressively to nature and her forces, is composed of individuals who in one way or another have to live and to experience together, and who seem to be unable to do this without reasons and motives even if some of these reasons and motives are or become specious.

When we discuss adjustment here, let us keep in mind that we discuss it from the point of view of the individual who has to adjust in and to a situation. One could in still broader terms say that we discuss the adjustment of a subject to an object, this object containing anything which may be found in the subject's environment, not-living and living things, including fellowmen. If we call this object comprehensively situation, we want to indicate that the subject himself, the individual, the human being or the person, is an essential and integral part of the situation. It should be mentioned that once in a while there may actually not be any other living beings in the subject's immediate surroundings.

The statement that a subject or individual adjusts *in* a situation does not call for any qualification. The contention that the subject adjusts *to* a situation is less self-evident. It leads directly into the midst of what our topic announces, namely, limits of adjustment. This means here that there is scarcely any complex situation to which the individual, even if he is possessed of a high degree of adjustability, can perfectly adjust. To say it again, adjustment is a never-ceasing process, a process of utter elasticity and flexibility. As soon as any rigidity enters into it, the very backbone of adjustment proper is threatened. Situations change. Every new situation necessitates adjustive changes. Hence when the subject has made himself perfectly at home in situation A, he will be seriously handicapped in his adjustive arrangements to consequent situation B. Concretely speaking: it may be a hard piece of adjustment to get out of a comfortable chair gracefully in order to receive a visitor or to climb solemnly onto the lecturer's platform. It may be equally hard or harder after hours of work at one's desk or in one's laboratory, to come back to the simpler joys of life regardless of whether they concern a visit to the barber or attending a luncheon-meeting. Did you ever notice an absent-minded professor's forlorn look when you met him in the barber-shop or at the luncheon-table? This look tells you better what I want to say than any theoretical remarks, but don't think that I would call the

professor a maladjusted person. On the other side, if a person never makes himself moderately at home in any situation, he is likely to miss any degree of satisfactory adjustment, reminding one of a bee that would fly from flower to flower without ever sucking honey from any of them. Such a bee would certainly not be "adjusted" to and in bee life and would probably be eliminated very fast.

With these observations I have indicated the scope of this talk—perhaps too large a scope for a talk. Let me now turn to some elaborations. Biologically speaking, every organism is living in a milieu to which it adapts itself according to its biological potentialities and capacities. These potentialities and capacities determine the *adaptability* of the organism; beyond its potentialities and capacities the organism cannot adapt itself. If they are taxed unduly the organism will suffer. If the strain on its adaptability becomes too heavy, the organism perishes. A worm, for instance, cannot fly off if he is picked up by a bird. A lobster cannot survive if he is thrown into boiling water. If we use the terms adaptation and adaptability, we do not think of, at least we do not stress, the personal and social aspect of the creature under consideration. Whenever we talk or think of persons in situations, we use the terms adjustment and adjustability. That means for us that from the biological point of view, a person is an organism too who has to adapt to the milieu in which he is alive. A person, however, is not only a biological organism, but an experiencing social creature, a member of a group exposed to its social and socializing, cultural and culturalizing influences, which he experiences and to which he adjusts more or less successfully. We say influences to which he adjusts more or less successfully. There are continually demands which the person is not able at all times to meet in their entirety. The mind is willing but the flesh is weak. His adjustive assets and liabilities put the person under never-ceasing social-cultural obligations. They also hinder him ever so often from following his own whims and desires, *i. e.*, they frustrate him. Adjustment cannot be made without some frustration. It is the group, the culture which imposes frustration on the individual letting him know at the same time that he should not moan, but at best slightly sigh under this burden.

Superficially adjustment is manifested in the behavior of the person. It appears that only in the very young person is behavior a clear and somewhat reliable indicator of adjustment. He does not know yet about frustration. Soon the socializing forces take hold of the individual, and teach him "how to behave." He can no longer do as he pleases unless he does not mind running into trouble, but he has to obey an increasing number of regulations or mores prescribed by the code of the cultural group to which he belongs. We see children and youngsters who adjust too well to these trying impositions; who always obey; who never utter any objection; who develop as model children with whom parents and educators do not have any difficulties. Strangely enough we have a sort of uneasy feeling about such boys and girls; they behave so exemplarily—they are so marvelously adjusted, or appear to be, and as a matter of fact, in many such instances some storm breaks before too long, maybe in the 20's showing that the previous adjustment of these youngsters was a specious affair. Their behavior, according to which their adjustment had been superficially adjudged, was made possible by tremendous self-control and repression. They were frustrated to a very high degree. Theirs was not an adjustment as we see it in the "normal" adolescent, who does not fail to show some rebellious trends—trends that rather quiet than disquiet the observer who is accustomed to dealing with young people. We would have to say paradoxically that the youngster who is kicking up his heels and who is apparently "maladjusted" behaviorally, is experiencing the developmental changes he undergoes within, and the restraining influences he has to meet without in a "normal" way; he is experientially well-adjusted. The subdued, over-obliging youth, however, despite his seemingly perfect behavioral adjustment, is experientially out of step with the evolutional changes he is supposed to go through; he is experientially maladjusted.

This is but one example to demonstrate that it is incorrect to be led by observation of the behavior alone in adjudging the "real adjustment" of a person. Adjustment is very much a matter of what is going on within, physiologically and experientially, and of these goings-on behavior is in many instances only a rather incomplete and superficial manifestation.

Another aspect of adjustment is implied in the given example. We started by discussing the adjustment of subject to object or, as we prefer to say, of person to situation. We have to amplify this. A person finds himself in a situation to which he has to adjust, but he has also to adjust to himself. This adjustment to himself is very often not expressed in his behavior. If we, however, do not try to find out something about it, we may remain pretty much in the dark as to the person's "real adjustment." The self-adjustment of the person beyond question is very much dependent on his physiology which, after all, is finally responsible for his capacity of experiencing and for his way of experiencing. It is safe to say that in deficient self-adjustment, the bases of many handicaps of social adjustment are to be sought and found. In other words: limits of social adjustment. It is obvious that a person who was born a cripple is handicapped in his self-adjustment and consequently in his social adjustment. It is scarcely less obvious that the same holds true, to some degree, of a person who is born feebleminded. Furthermore, it is easy to understand that there are difficulties in self-adjustment as well as in social adjustment to be expected in persons whose emotional endowment is deficient or unbalanced. Feebleminded people may be trained considerably and emotionally unstable people can learn some emotional control; but even then both kinds of people are, as far as their self-adjustment and social adjustment are concerned, at a definite disadvantage in comparison with their more fortunately endowed fellowmen. Using the example of adolescents again, one can say that the rebellious boys and girls are much more apt to accept themselves as they are, to adjust themselves to themselves, if at the expense of their surroundings; whereas the obliging youngsters unable to come to terms with themselves, allow themselves, at least for a while, to be utterly molded by the outer influences. This is a curious display of adjustive queerness.

Summarizing our foregoing discussion, we find: the person has to adjust to himself and to his situation. The term situation means, in our context, pretty much the same as the term environment as it is often used in discussions on adjustment with the possible difference that here situation definitely points to the person; conveys, or should convey, the meaning of a more individual or personal relationship between person and outside than the word environment

in general does. Forgetting the individual person and his situation for a moment, let us look at people at large and their environment. We realize that people at large are persons with self and situational adjustments, but people are not just figureheads moving or moved in their environment; people are acting, people are doing things, in and to their environment—they change their environment—they turn a desert into wheat fields or orchards—they build houses—they make friends and enemies—they love and hate—they organize communities—they adjust their environment according to their needs and desires.

Turning again to the individual, we can now say that he has to make a threefold adjustment:

1. He has to adjust himself to himself. This is *self-adjustment.*

2. He has to adjust himself to his situation. This is situational adjustment in which he plays a more passive rôle, in which he allows himself to be played upon and influenced by the situation. We may call this *passive adjustment.*

3. He has to adjust the situation to himself. He takes an active attitude towards the environment. He influences and changes the environment to a higher or lesser degree. Let us call this *active adjustment.*

These three terms may appear arbitrary. There is no doubt, however, that the three attitudes which they designate are implied in what is called social adjustment. We do not mean to say that there are three different kinds of adjustment. We want to emphasize, however, that social adjustment can and should be looked at as having three aspects: in other words, social adjustment is a threefold process. In any actual adjustment of a person in and to his situation, one or another of these three aspects may be more or less accentuated. But all three of them are always present whenever and as long as a person is adjusting himself socially.

From the cradle to the grave the person is continuously developing and changing. One has found it useful theoretically to divide the life-span of the individual into a number of periods, namely, infancy and childhood, adolescence, adulthood and old age. This is not a merely biological, but rather a biological-cultural timetable. The cultural group in which the individual lives expects him to obtain certain morphological and physiological characteristics within certain periods. The group furthermore expects the

individual to display and not to display during these periods certain behaviors, behavior patterns, dovetailing with the group code. Let us exemplify for our own culture: the child is expected to talk and to walk and to remain innocently ignorant. The youth is expected to round out his training, to prepare for self-support and to keep up part of the child's innocent ignorance. The adult is expected to face reality—whatever that may be, to be independent, to be productive and constructive in his work, to marry and support a family, and to prepare for his and other people's old age. Old people are expected to be kind and wise and ready to face another reality, namely, death. This exemplification is, of course, oversimplified. I trust, though, that it is to the point. Now, all these expectations would be amply justified if (1) all people were born with the same or very similar potentialities; if (2) the development of all individuals would somewhat conform biologically to the time-table; if (3) the impact of the situation—physical and cultural—would chronologically click with this biological development to perfection. All these conditions fall short of what happens, as in fact (1) people are born with very different endowments; (2) individuals are not developing according to a clock; (3) no provisions exist or could exist to time and regulate the impact of the situation in accordance with the actual development of the individual in his group.

As matters stand the expectations of the group as enumerated present *per se* definite limits of social adjustment. The development of numerous individuals on biological and cultural grounds makes it impossible for them to live up to the group's adjustive standards. There are very numerous minor and major individual deviations on the biological side of the time-table with all manner of consequences for its cultural side—a child may not walk and talk at five; most adolescents are not even partly innocently ignorant (and why should they be?); some adults never become independent; some never marry, and there are a few old people who are neither kind nor wise.

What I want to say is this: in whichever chronological period of his life the individual may find himself, he may or may not be ready for a variety of causes and reasons to behave as the group expects him to behave, he may or he may not be able fully to

assume the rôle assigned to him on the social stage according to the biological-cultural time-table.

Primarily or secondarily he may realize this state of affairs and become disappointed, disgusted, unhappy with himself—handicapped and bewildered as to his self-adjustment. Primarily or secondarily he may resent and feel repulsed by any number of outer influences and find and make difficulties in his passive adjustment. As a rule secondarily he will, as far as his active adjustment is concerned, either do too little, viz., withdraw and play dead; or he will do too much, viz., be overaggressive. Yet we would not think that his overt behavior in all instances is a full and entirely true reflection of his "real adjustment" which, it should again be said, is an inner—physiological and experiential—and an outer—social and cultural—affair. We need not here go into details as to the frustration involved in the circumstances mentioned.

Granted the limits of adjustment as determined by the potentialities of the individual and by the physical and cultural impingement, we should not feel pessimistic. The adjustability of a multitude of individuals who are not very fortunately endowed, is even in our culture often not strained to or even close to its limitations. Furthermore, we have to realize that it is rather a sweeping statement to talk about "our culture," as we learn from the sociologists that there is in any group not one but a variety of cultures to whose influences the individual is exposed. It appears to be probable and plausible, then, that not all these sub-cultures, as they are called, are equally oppressing or dangerous to every individual, and that sub-cultures may be present which, as they impose less on certain people, would not arouse their antagonism or hostility but rather attract them and enable them culturally, *i. e.*, socially, to adjust, at least to a degree. And this is what actually happens. Individuals can and do give up wrestling with cultures or sub-cultures that frustrate them too much and find an adjustive arrangement with less exacting sub-cultures. This may not always make them supremely happy but it permits them to live in some peace and comfort and saves their feeling of human dignity. And it shows a considerable degree of adjustability.

We would not consider this degree of adjustability abnormal or pathological but rather assume that to some extent this is the manner in which a good many people—not only the less fortunately en-

dowed ones—come to adjustive arrangements. As culture in a group develops, broadens, gets more and more ramified and diversified it becomes increasingly difficult, even impossible, for every individual to get acquainted with, to keep abreast of, all cultural developments. Cultural specialization of the individual becomes necessary as, *e. g.*, is clearly seen in the historical development of the professions. In the middle ages they had what they called a handful of "polyhistors," savants who knew practically everything that was known in medieval sciences; who thus were remarkably adjusted to the highlights of medieval culture. One may wonder how far these polyhistors were adjusted in other departments of life and experience, and whether or not most of them were bookworms who missed adjusting to the realities and enjoyments of everyday life. Nowadays it is impossible to be a polyhistor. After all, how many books are you able to read and to digest during a long life? Say ten thousand. How many, then, are left that you do not even know of? Millions, certainly. How much does a well educated person know about art, about any branch of science unless he specializes? How much can he know? There are numerous and vast fields of human endeavor and knowledge about which many scientists or artists are scarcely less ignorant than the man on the street. And these are only parts of culture, sub-cultures—subcultures, indeed, to which the individual cannot even try to adjust because the total cultural situation is so complex. Yet an adjustment as fair and individually and socially as satisfactory can be reached as in less complex cultures if the limitations are acknowledged and intelligently heeded.

Perfect adjustment would not be possible anyway. The individual's day has 24 hours, and if he cramps all his waking hours with work he is bound to miss a satisfactory adjustment; if he crowds them with play the same holds true. But even if against all common sense one should deem it possible that an individual could come to a "perfect adjustment" one would have to say that this were not a desirable performance. For such "perfect adjustment" would either be in most, if not in all, respects a tremendously shallow and superficial affair, *i. e.*, it would not be a real adjustment at all; or such "perfect adjustment" would tend to be and soon become entirely rigid, entirely static—and this,

in the sense we give to the term, would and could not be a "real adjustment" either.

As we have emphasized and want to emphasize once more, adjustment is a never-ending process, adjustment from the viewpoint of individual and group is utterly dynamic. If adjustment stops being dynamic, it ceases to be adjustment. It often happens that individuals get rigid in some of their opinions, in some of their attitudes towards life and experience; then they no longer adjust in these respects. But there remain for them other fields in which they can and do continue dynamically to adjust—their adjustive potentialities and capacities, *i. e.*, their adjustability as a whole is not exhausted if it stops working in a few fields. In this regard we find definite differences among individuals—there are some whose adjustability early in life runs along a very narrow path, concentrating, as it were, on one or a few sub-cultures; there are others whose adjustability may be compared to a broad stream unhampered, rolling along until late old age. There are all manner of individual adjustabilities between these extremes—distinguished by breadth or depth, narrowness or shallowness of adjustability and adjustment.

One of man's major concerns is to live and to experience with fellowmen, to live and to experience in a group to which he belongs. The desire to belong, the desire for human contact is a fundamental human craving. Man cannot live alone on account of biological causes and social-cultural reasons. This craving for contact varies in its intensity and extent among individuals, and it is tremendously influenced by the group and its culture (or cultures). To satisfy his craving for contact man is ready to bring all kinds of sacrifices, to shoulder any degree of frustration. The craving for contact plays, in human adjustment, a rôle that can be scarcely overestimated. If the craving for contact cannot be gratified, the human being suffers grave anxiety and cruel deprivation. He then enacts adjustive experiments which are apt to give him some substitute gratification. There are people who, on grounds of peculiarities in their makeup, are unable to find the way to the hearts of their fellowmen, who withdraw and try to build up their own world in which they dream of contacts which are denied to them in our common reality—delusions of grandeur or persecution are often the solution of their problems of contact and adjustment. Do not

let us assume, though, that dreaming and imagination are a monopoly of such individuals. There are, I presume, very few human beings who never dream and imagine, who never seek some repose from this harassing world in a quieter, less troublesome world of their own.

Here we have to think of a relatively small group of individuals who not only excel in dreams and imagination, but who, on the very grounds of their imaginative gifts, are the standard bearers of culture, the pioneers of new ideas and new ways in every walk of life. I am, of course, talking about the geniuses. The genius, as a rule, is a lonely person; the very fact that his are highly superior gifts, makes him outstanding in his group, prevents him from becoming an obliging backslapping member of society. Mostly geniuses are people difficult to live with; some are, or seem to be, provokingly conceited, often complaining of lack of appreciation. They may come to some sort of efficient self-adjustment, but they often rebel vigorously against passive adjustment; on the other side, creating the highest values, they change the environment; they are definitely aggressive as regards their active adjustment. Exercising such a high degree of active adjustment, the geniuses are apt to repulse their fellowmen who feel uneasy about them anyway and who, after all, desire to live peacefully; this repulsion further increases the geniuses' original loneliness. The geniuses, however, find some reward and compensation for their loneliness in their achievements, in their creations; what they do, however maladjusted they sometimes may be or seem to be, contributes to the progress of the human race. Yet this progress probably would be jeopardized if there were only geniuses; it is the multitude of people living and working along in a more or less fair adjustment to their situations, who provide the stabilizing matrix for the cultural development of the race.

Achievement and prestige are human incentives of highest importance. Man living and enjoying his life in the group wants to do something, wants to achieve something—this is an integral part of his adjustment; and for his achievement, however modest it may be, he desires some appreciation—appreciation gives prestige. Achievement and prestige determine the individual's standing in his community. The part they play in adjustment is not less obvious than that played by the craving for contact. If the individual has

the opportunity to achieve according to his abilities, and if his achievement is appreciated in a way satisfying his desire for prestige, he will find it easy to adjust. If he has but the chance to achieve and is not appreciated, he will feel frustrated and fail satisfactorily to adjust. May I leave it to you to ponder about various individuals who, for lack of appreciation, come to difficulties in their self-, passive and active adjustment?

There are in every group a number of people whose craving for prestige by far surpasses their capacity and willingness to achieve. Their behavior is often characterized by a tendency to shine, to put on a show. Some of them are virtuosos in finding ways and means to attract attention and to put themselves in the middle of the stage. One could say that their motto is: everything is fair that increases my prestige. It is a group highly interesting to the psychiatrist; they make their contribution to the community—in their way—often with great, if mostly episodic, success as people at large love to be fooled. These prestige-seekers are persons who, from the point of view of adjustment, are exceedingly versatile, but they are as shallow as they are versatile. For a short while they adjust to every conceivable situation, but they remain always and everywhere on the surface; they do not seem to want to be themselves but rather slip into any rôle that permits them to gain some more prestige. The conclusions as to their threefold adjustment can be drawn easily.

We have been discussing adjustment from the psychiatric point of view. The psychiatric approach starts from and through the individual with the understanding that the individual is not living and experiencing in a vacuum, but in a situation. With the understanding, furthermore, that the individual is not merely a biological organism, but as we have said, an experiencing social creature, *i. e.*, a person passively and actively participating in the culture or cultures of his group or groups. Adjustment, then, is not something some wise men have invented for their mutual entertainment, but a necessity vital to man. We have seen that limits and limitations of adjustability and adjustment exist in the person himself and are imposed upon him by his physical and cultural environment. We have given a number of illustrations from our psychiatric viewpoint. We cannot, of course, fail to be markedly influenced by our sociological colleagues—as a matter of fact we would think

that any psychiatric remarks on adjustment that would be entirely out of touch with their findings, should be critically revised. But we are psychiatrists, that is physicians, and the basic purpose of our profession is to help people—be it by preventing their getting into distress, or be it assisting them in getting out of distress. Hence we have to postulate that our considerations on adjustment and its limits are of some medical-practical value.

We believe this to be the case. We believe that one has just begun to come down to brass tacks concerning adjustment; one has been using the term too glibly. One has very probably, in some instances, tried to do too much about it. One has, unless we are thoroughly mistaken, attempted to overadjust people, entailing the danger of overstraining and consequently curbing people's adjustability, of making them rigid instead of letting them move as freely as is feasible without damage to the community. We are, however, optimistic enough to hope that by careful handling of their adjustability, the lives of a goodly number of persons can be made happier and more successful. But we do not want to stretch them in a Procrustean bed of adjustment: we desire to let them do the adjusting as dynamically and flexibly as they can do it—within their limits.

CLINICOPATHOLOGIC CONSIDERATIONS FOR DIFFERENTIAL DIAGNOSIS BETWEEN JUVENILE PARESIS AND OTHER FORMS OF ENCEPHALITIS.*

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The following case seemed worthy of presentation and discussion because on both its clinical and pathological aspects there were many difficulties in making the differential diagnosis. A definite clinical diagnosis was not made during life. Pathologically considerable difficulty was met in establishing the differential diagnosis between varied forms of encephalitis and juvenile paresis.

Case History.

The patient, F. L., was a boy, age 9, with an onset of illness in November, 1935. At that time his school psychiatrist and teachers reported to the parents that the quality of his school work showed definite falling off. His writing became illegible, he frequently lost his way in the school building and showed frequent mental confusion in answering questions. At home his parents noted that he "acted dumb." Because of his apparent stupidity they often lost patience with him. So far as could be recalled, no one noticed any ataxia or peculiarity in gait at that time, except for the fact that occasionally he fell down, "as if his knees caved in." Occasionally articles fell from his hands, especially the right.

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The authors are indebted to Dr. Marion Morse, Endicott, New York, for the clinical study of the patient, for the opportunity given one of us (G) to examine the boy during life and for the opportunity of obtaining the pathological material.

In December, 1935, the boy complained of vertigo. In January, 1936, he had a period of vomiting associated with headache, which seemed to be precipitated by a bus ride of about 14 miles.

The past history appeared irrelevant except for a report of a fall from a small coaster wagon, in the summer of 1935, at which time he rolled down an embankment but appeared to escape uninjured.

The family history was negative for syphilis. In 1935 and again in March, 1936, the mother's blood test gave a negative reaction and in March, 1936, the father's blood likewise gave a negative result.

When first examined in January, 1936, the general physical examination was negative, except for tonsilar infection. Neurological examination was very difficult because of mental confusion and deterioration. No ataxia was noted at that time. There was a suggestion of a Babinski response on the right. The spinal fluid examination February 2, 1936, revealed a clear fluid with negative culture and no pellicle formation. The cell count was 5, the glucose 58, NaCl 640, the colloidal gold test gave a reading of 1322100000. The spinal fluid and blood Wassermann test were negative.

The mental deterioration was rapidly progressive, and the patient finally became prostrated. Nothing suggesting a localized cerebral neoplasm could be determined. The child was sent to Dr. Grant in Philadelphia for further study. He reported an injected right eardrum, septic tonsils and an old retinal exudate in the right eye. Neuropsychiatric examination revealed poor memory, low grade intelligence, lack of cooperation and indifference, partial aphasia, astereognosis and questionable spacial disorientation and staggering gait. In addition, finger to nose test revealed bilateral ataxia, the reflexes were equal bilaterally and all tended to be hypoactive.

During the first four or five days that the child was in the hospital in Philadelphia he seemed to become stuporous at about seven o'clock in the evening. On two occasions he was aroused with intravenous hypertonic glucose injections. Before the injection, on the second occasion, a lumbar puncture revealed a clear fluid under 100 mm. of water pressure and containing 3 units of globulin, 43 mg. of glucose, 710 mg. chloride and a colloidal gold test in which the reading was made up entirely of 5's. A glucose tolerance test was taken at the same time which gave a fasting blood sugar of 68, 81 at 30 minutes, 95 in one hour, 63 at two and a half hours and 55 at three hours. At no stage in the illness did the urine give a positive sugar test.

One week later another lumbar puncture revealed clear fluid of 95 mm. of water pressure, 1.2 units of globulin, 55 mg. glucose, 706 mg. chloride and a colloidal gold reading of 5555554310.

A third lumbar puncture March 4, 1936, gave the same colloidal gold curve as the second puncture. In addition, there was a pressure of 150 mm. of water, 1 unit of globulin and a clear but slightly xanthochromic fluid.

Blood hemoglobin determinations on four occasions gave figures ranging between 72-88 per cent. The white blood count varied between 8600 and 10,300 and the red blood count was 4,600,000. It was never possible to obtain visual field determinations due to the poor cooperation.

An encephalogram report suggested the presence of a questionable, deep-seated process in the left basal ganglion region.

During the last two weeks of the patient's stay in Philadelphia, definite optic atrophy began. The temperature was in general slightly subnormal, pulse tended to be rapid. The general opinion at that time was that the boy probably had either chronic encephalitis or some other inflammatory reaction in the left basal ganglion region, or possibly, in spite of the negative serology, a juvenile taboparetic condition.

After the patient's return from Philadelphia, March 26, 1936, to the Ideal Hospital, Endicott, New York, he remained in a state of lethargy for most of the time. Only once or twice did he become aroused sufficiently to reply "Yes" or "No." At first he appeared completely flaccid for a few days. After this he became somewhat spastic for several weeks, following which he again became definitely flaccid at which time the tendon reflexes were absent. His pupils continued to react to light, but sluggishly. While generally lying in a state of stupor, he occasionally was aroused at sudden noises. In the middle of May, 1936, the patient became very spastic, almost to a degree of generalized tetany. He remained essentially in this state until his exitus. At the slightest sound or disturbance of any type he manifested a generalized convulsive seizure. The knee jerks were exaggerated. There was a bilateral Babinski. Ankle clonus was not present. The abdominal reflexes were present on the right side only. The triceps jerks were active. The upper extremities showed beginning contractures and the lower extremities were spastic in extension. The eye grounds showed progressive atrophy with progressive haziness of the right nerve head and definite optic atrophy on the left. Spinal fluid examination revealed 13 cells and a colloidal gold test of 5443210000. Levinson's test negative. The temperature during the period of illness between March 26 and his death on June 1 varied from 98.8 to 105. For the first few weeks of this period the temperature was either subnormal or normal. On April 12-13 there was an elevation to 103.4° and from April 23 to the end of May there was an irregular fever up to 102°. After May 23 the temperature reached 104° and, finally, 105° on the day of exitus.

Aside from the nose, throat and mouth infections, nothing was found to account for the temperature. The patient developed large blebs on the face and chest. These were not impetigenous. Those in charge believed them to be of terminal toxic origin or perhaps due to drugs.

While in Ideal Hospital the following findings were recorded:

On March 31, 1936, there was generalized spasticity, stupor, rigidity of the neck, positive Kernig, coarse muscular twitchings, knee jerks 1+, radials 3+ and ulna jerks 1+.

On May 14, 1936, the knee jerks were 4+; there was a bilateral Babinski with no ankle clonus. The only abdominal reflex elicited was the right lower. The arms were very spastic and manifested contractures.

The patient died June 1, 1936, at Ideal Hospital, Endicott, N. Y.

It is of interest that many clinical diagnoses had been suggested during life. Among them were juvenile taboparesis, some chronic form of inflammatory process, encephalitis, Schilder's disease and multiple sclerosis. Even brain tumor was considered at one time. However, no definite diagnosis of the condition was made during the lifetime of the patient.

Gross Pathological Findings.—The autopsy was negative except for the nervous system. The brain was of average size, weighing 1,450 grams in the fixed state. On external examination the small pial vessels appeared injected, particularly over the superior convexities. The convolutions were full, with nothing remarkable about the membranes. The blood vessels of the left basilar ganglion region appeared somewhat dilated, giving this structure a slightly moth-eaten appearance. Throughout the white matter of both hemispheres, particularly of the occipital and parietal regions, there were numerous petechiæ. No other gross evidence of disease was noted in either the cerebrum or cerebellum. The lower segment of the cord appeared to show a rather abrupt tapering of the sacral termination.

Microscopic Findings.—The findings, while essentially the same wherever found in the central nervous system, may be best described in terms of findings in the brain and findings in the spinal cord. The Nissl nerve cell preparations of the various regions of the cerebral cortex and basal ganglia revealed a very interesting picture which was characteristic for the whole nervous system. The pathological changes in the cortex involved the deeper layers of gray matter, predominantly, and the white matter immediately underlying it. The histological structures involved included the nerve cells, the blood vessels and the glia.

Nerve cell changes of all degrees could be found throughout all regions of the cortex. These ranged in severity from simple, slight swelling with eccentricity of the nucleus to complete disappearance of the nerve cells with or without accompanying satellitosis or with neuronophagia. In some places large numbers of nerve cells had completely dropped out leaving acellular areas. The destructive processes involving the nerve cells were so severe and widespread that in many places a marked disturbance of the normal lamination of the cortex resulted. Although the cortical involvement was general, the frontal and parietal regions showed perhaps the greatest pathological changes. Figs. 1 and 2 are microphotographs of the frontal and parietal cortices and demonstrate the marked loss of cortical lamination seen throughout the brain. Cell changes were moderate in intensity in the basal ganglia regions, including the thalamus, putamen and globus pallidus.

Of probably equal prominence in the Nissl preparations of the cerebrum were the vascular changes. In general there appeared to be an increase in the number of small vessels in the cortex and in the immediately subjacent regions of the white matter. In addition to this numerical increase in blood vessels, there were also abnormalities of the blood vessels themselves and their surroundings. Cellular infiltration in the perivascular spaces was present to a greater or less degree in most of the smaller or medium-sized vessels of the cortex or subjacent white matter. In some vessels the

cellular infiltrations formed complete collars whereas in other regions there were only a few cells which incompletely filled the perivascular spaces. The cells were mainly of the small-sized, round cell variety. Numerous plasma cells were found in the perivascular infiltration, however. In addition to the perivascular infiltrations, some of the vessels of smaller size showed a definite thickening of the endothelium. In general, the vascular changes were present to the greatest degree in the deeper layers of the cortex and in that portion of the white matter immediately under the gray matter. The blood vessels of the left basal ganglia region were in general involved to a considerable degree.

One of the most characteristic findings seen throughout the entire nervous system was the presence of small glial nodules. These could be clearly seen with Nissl preparations and with the Hortega silver carbonate preparations. Fig. 3 shows such a knot from the deep cortical layers of the frontal region as it appeared in Nissl nerve cell preparations. In such sections the nodule seemed to be composed of perhaps four to six or more elongated cells with rather short processes and narrow bodies. In general, the cells were oriented in a sort of star-shaped formation. Silver carbonate preparations revealed these cells to be probably microglial in type, resembling closely the rod cells. Fig. 4 shows such a knot as seen in the Hortega silver carbonate preparations. The nodules, while present to some extent in practically all parts of the central nervous system, were very numerous in the cortical regions where the abnormalities in the nerve cells and blood vessels were most prominent, namely, the deeper layers of the gray matter, the immediately subjacent portions of the white matter and the basal ganglia.

Another prominent variety of microglial change was found in the numerous rod cells in some portions of the cerebral cortex. Fig. 5 shows a great number of such rod cells in a section of the frontal cortex as prepared by the Hortega silver carbonate method. Their distribution throughout the cerebral cortex was not uniform but varied considerably from place to place as did the nerve cell lesions, the vascular involvement and the glial nodules.

The oligodendroglia, as seen in the Hortega silver carbonate preparations, were essentially normal, except for a moderate degree of acute swelling which was general in distribution and seemed to bear no direct relationship topographically to the regions of major pathological involvement.

The astrocytes, as demonstrated by the Cajal gold sublimate stain, seemed to be taking a minor part in the general response of the nervous tissue. They bore no direct relationship to the nodules. In those regions around the blood vessels in the white matter where the perivascular infiltrations were prominent, regressive changes could be seen in the astrocytes. No marked general glia increase involving the astrocytes was detected. Myelin sheath preparations revealed no degeneration of these structures. Fat stains likewise revealed no abnormal amount of fatty products of degeneration in any of the regions studied. Stains for iron (Turnbull's method) failed to reveal iron in the cortical regions studied.

The same type of involvement seen in the cortical areas and basal ganglia could be found throughout the whole nuclear series of the brain stem. The perivascular infiltration, the glia nodules and the cellular destruction seemed to bear no predilection for any certain regions of the brain. The substantia nigra, except for occasional lesions of these types, was relatively spared. Fig. 6, taken to show the substantia nigra, with the Nissl stain, shows that most of the pigmented cells were well preserved. A relatively mild perivascular infiltration with destruction of a few nerve cells and formation of a few glial nodules comprised the abnormalities found in this region. Such mild involvement could be easily contrasted with the usually severe destruction in this region in most cases of encephalitis lethargica.

In the tegmentum of the pons and medulla there was a mild degree of pathological involvement of the same types as described above. In the cerebellum the same types of change were also found. The perivascular infiltrations were present particularly in the white matter in the vessels bearing a close relationship to the internal granular layer. The glia nodules were present particularly in the nuclear groups, including the dentate nuclei and roof nuclei. Most of the Purkinje cells were fairly well preserved. In a few of these cells some degree of paling seemed to have occurred and nuclei were not visible. No multinucleated Purkinje cells were found.

Throughout the spinal cord the gray matter was the seat of a relatively mild pathological process. Most of the nerve cells, particularly those of the ventral horn, were well preserved. Occasional cells, however, could be seen in course of degeneration and some were mere shadows with evidence of satellitosis and neuronophagia. An occasional blood vessel showed a slight amount of round-celled perivascular infiltration but this was relatively rare. Probably the most noticeable findings in the spinal cord was a large number of glial nodules. These nodules, similar in every way to those seen throughout the brain, were rather diffusely distributed throughout the white matter. In the dorsal columns fiber system they were by far the most common. Spielmeyer myelin sheath preparations of the various portions of the spinal cord show no definite evidences of myelin sheath degeneration. Scharlach R preparations likewise reevaled no evidence of fatty degenerations except in a few sections from the lumbar reigons. In these sections one of the left incoming dorsal roots was found to be filled with compound granular corpuscles which were in turn filled with fat. In light of the absence of such a finding throughout the rest of the cord, the possibility was considered that the degeneration in this one root might have been due to direct trauma to the root. Holzer preparations of the cord revealed, as seen in Fig. 7, a definite increase in the gray matter of the fibrils stained by the method.

Discussion.

The history and microscopic findings in this case raise many interesting questions as to the differential diagnosis. Clinically the diagnosis was obscure. Various possibilities were considered

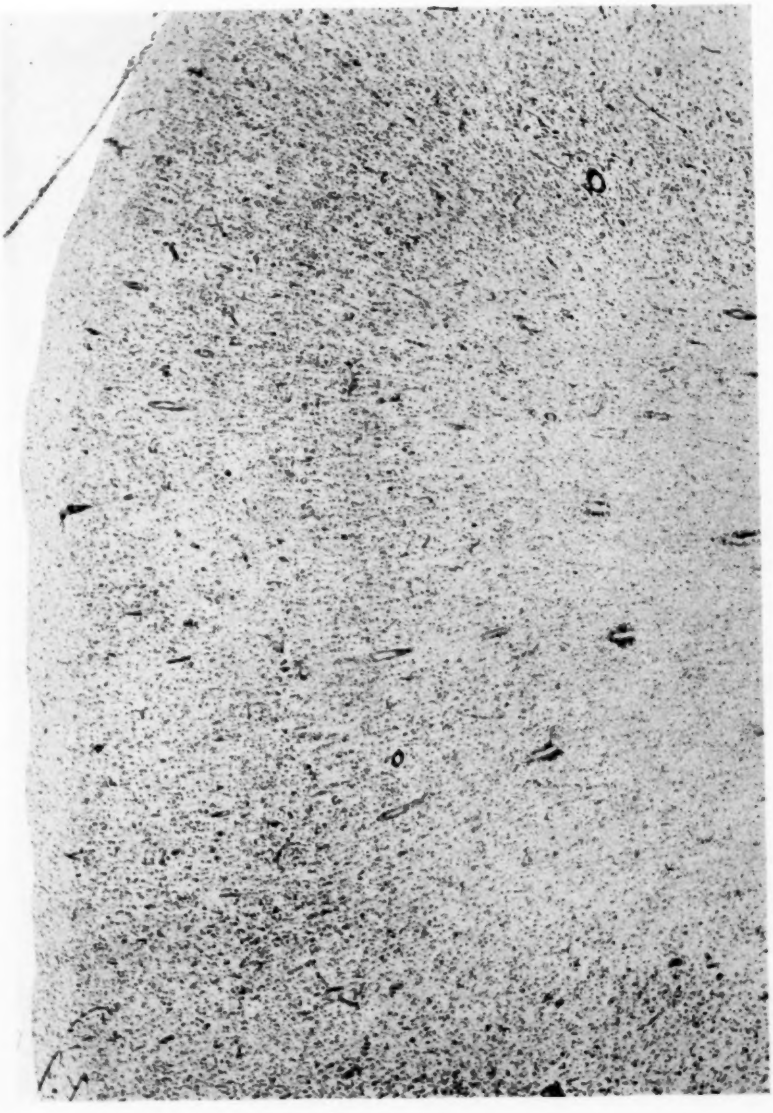


FIG. 1.—Section of the frontal cortex showing marked cellular destruction with acellular loss of normal lamination, relatively slight meningeal involvement, increase in the number of small blood vessels and perivascular infiltration. Nissl preparation.



FIG. 2.—Section from the parietal cortex showing again essentially the same features as Fig. 1. In this figure the involvement of the meninges at the bottom of the sulcus is slightly greater. Nissl preparation.

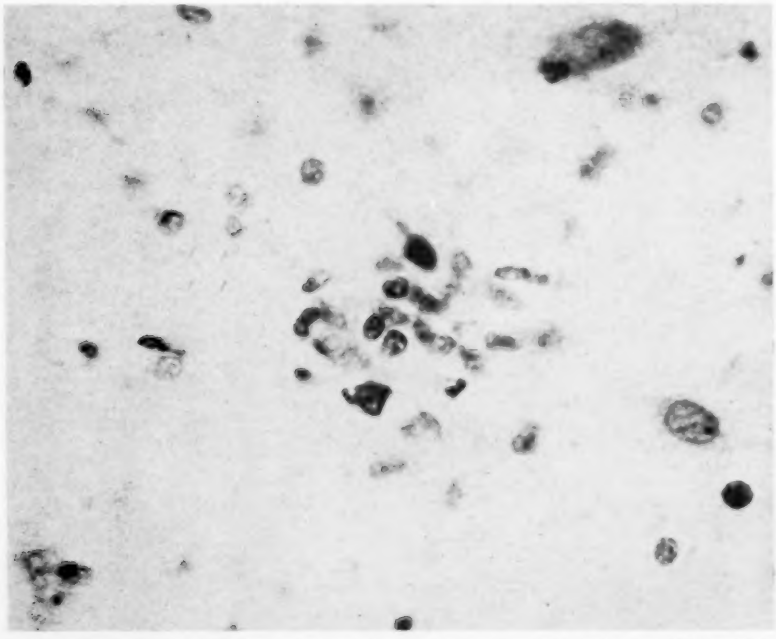


FIG. 3.—Section from the frontal region to show one of the characteristic nodules found throughout the nervous system. Nodules are apparentiy formed of microglial type cells. Nissl preparations.

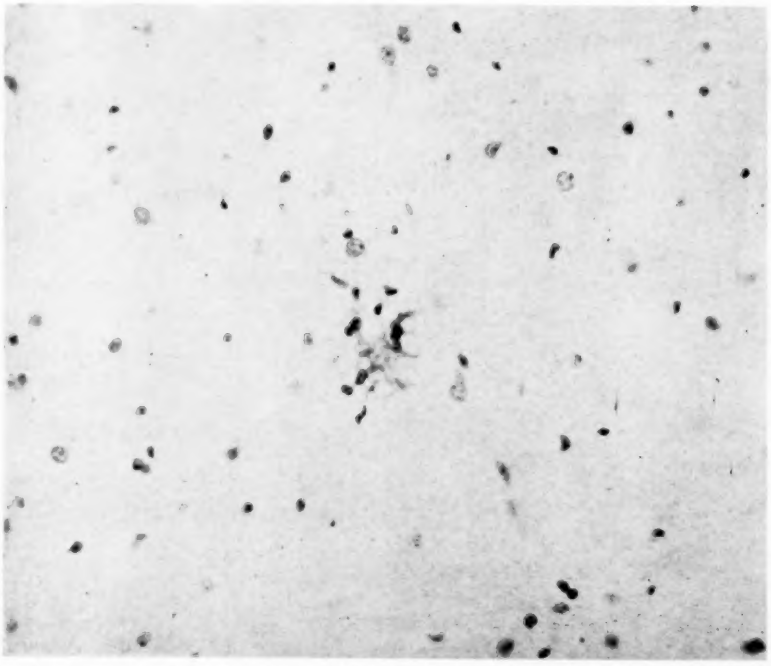


FIG. 4.—Section from the sub-cortical white matter of the frontal region to show again the silver preparation of the typical nodules as demonstrated in Fig. 3. Nodules of this type were found throughout the whole nervous system including the white matter of the spinal cord. Hortega silver carbonate preparation.

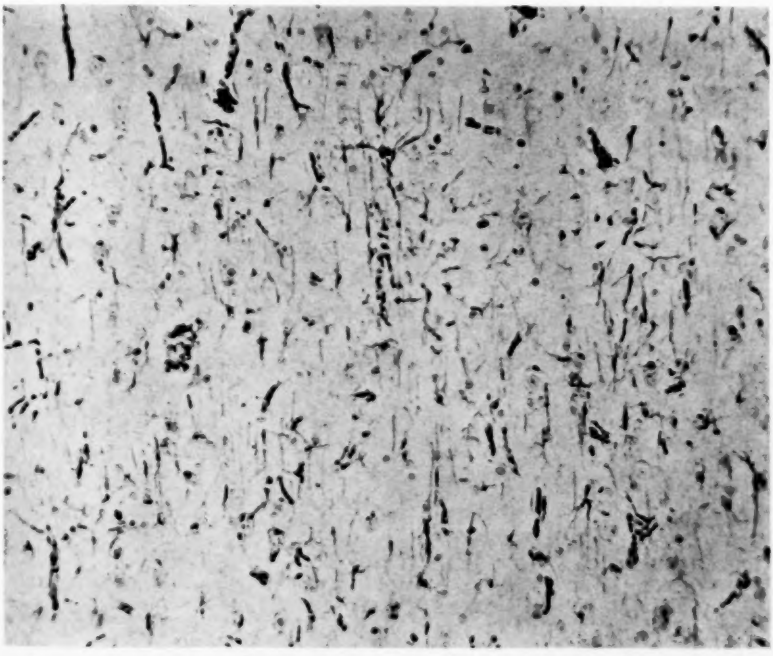


FIG. 5.—Section of the frontal cortex showing the large number of rod cells as demonstrated by the Hortega silver carbonate stain.



FIG. 6.—Section from the substantia nigra showing the good preservation of the large, pigmented cells, thus serving to differentiate the case from the usual case of epidemic encephalitis. Nissl preparation.

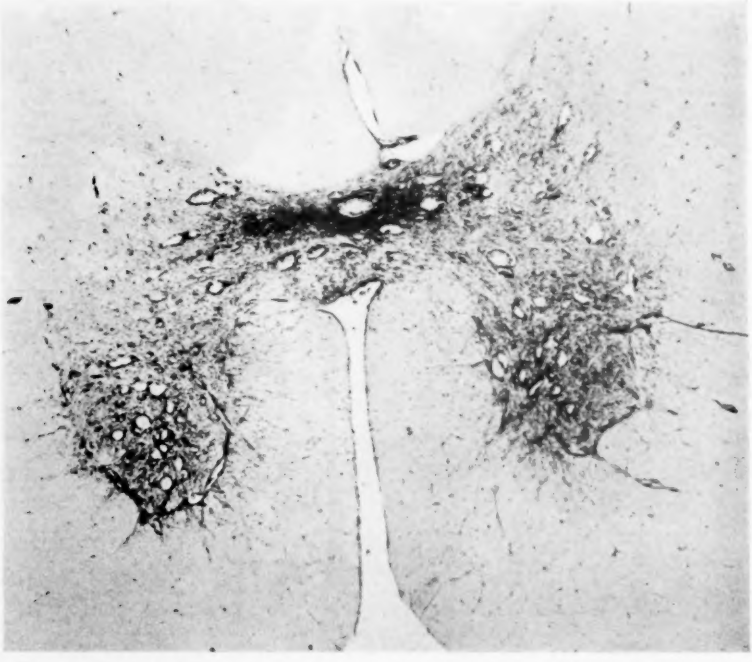


FIG. 7.—Section of the cervical spinal cord demonstrating the apparent increase in the fibrils of the gray matter as stained by the Holzer glia fibril method.

including brain tumor, some chronic inflammatory condition, multiple sclerosis, Schilder's disease and juvenile taboparesis. On the basis of the history and microscopic findings the two conditions requiring the most careful consideration would seem to be juvenile paresis and some form of encephalitis. The first point against a clinical diagnosis of juvenile paresis would seem to be the presence of negative serology in both the patient and parents. While it decreases the probability of juvenile paresis, in the patient, such negative serology would not completely rule out the possibility. Menninger,[1] in 399 cases, reported syphilis of the mother in 56 per cent and in the father in 56 per cent. He likewise reported a negative blood Wassermann in 7 cases of juvenile paresis and negative spinal fluid tests in 6 established cases, in two of which the blood Wassermanns were also negative. His findings seemed to justify the conclusion that "in the presence of sufficient evidence from the history, stigmas and clinical signs and symptoms, a diagnosis of juvenile paretic neurosyphilis is justified even though the Wassermann tests of the blood and spinal fluid may be negative."

It is of interest to note that whereas several cases, as mentioned above, have been described clinically as juvenile paresis even in the presence of negative serology, there has not been, according to the authors' knowledge, any pathological study of such a case.

In the present case the gold curve of the spinal fluid was of typically paretic type on more than one occasion. The meaning of this is not entirely clear. A similar curve was found by one of us (B) [2] in an apparently non-luetic case previously reported.

On the basis of the other clinical findings in the present case, however, a clinical diagnosis of juvenile paresis or taboparesis becomes less probable. Contrasted with the average age of onset in 542 cases as reported by Menninger, to be 13 years for juvenile paresis, the age of onset in the present case was eight years. Contrasted with the usually slow clinical progression of juvenile paresis, we have the rather rapid progression of the disease in the present case. According to Menninger the average interval between the onset of the disease and the clinical examination is usually slightly more than three years with considerable survival time after diagnosis. Here approximately seven months elapsed between the

clinical onset and the fatal termination. The course was much more acute in progression than the average case of juvenile paresis.

It would seem impossible to absolutely rule out a diagnosis of juvenile taboparesis on the basis of the clinical neurological signs, since practically every variety of neurological finding has been reported in well established cases. These include, according to Menninger and Schmidt-Kraepelin,[3] congenital stigmata, various cranial nerve abnormalities, speech defects, motor system disturbances of all sorts, convulsive attacks, sensory changes of many types, abnormal and pathological reflexes, temperature disturbances, various endocrinopathies, etc. In the mental pictures of such cases the same authors have included confusion, mental regression to simple dementia, inadequate emotional responses, restless, purposeless behavior, simple deterioration, visual and auditory hallucinations, delusions, memory loss, euphoria, catatonic behavior and sleep disturbances. It is of interest that in spite of the negative serology the possibility of juvenile taboparetic process was considered clinically in our case. But, especially with the negative serology, the development in a previously apparently normal boy of nine years, of a rapidly progressive disease seemingly involving much of the nervous system pointed to some other condition than that seen in the usual run of cases of proved juvenile paresis or taboparesis.

With the probability of a brain tumor being lessened by the absence of signs of increased intracranial pressure and the encephalographic findings, some chronic, progressive, encephalitic process seemed clinically worthy of consideration. With the predominance of " mental " features in the earlier stages of the illness, an early involvement of the parenchymatous tissue of the cerebral cortex would seem probable.

Just as the clinical features of the case raised many questions as to the diagnosis, so did the histological findings. However, as first approximations, some conditions which might have been considered possible in light of the clinical syndrome were ruled out by the preliminary pathological findings. However, there was no evidence of any spotty or generalized demyelination, thus ruling out a multiple or diffuse sclerosis or other types of demyelinating processes.

In light of the general histological findings, three conditions were considered paramount for differential diagnosis. These included juvenile taboparesis, epidemic encephalitis and some form of polioencephalitis. One was impressed immediately upon study of sections of the cerebral cortex by the many similarities between the tissue changes in this case and those commonly seen in juvenile paresis. First of all the gray matter was predominantly involved with, however, some involvement of the white matter. Secondly, the process was here, as in juvenile paresis, a combination of inflammatory and degenerative changes with involvement of both the vascular structures and the parenchyma. Even plasma cells, which are so commonly diffuse in paresis, were numerous in this case. In addition, another finding commonly seen in the paretic brain reaction was the large number of rod cells. These were present in great number in the case under discussion.

There are, however, aspects of the case which tend to differentiate it from the usual case of juvenile paresis. First of all, there are the gross pathological findings. In the present case the nervous system was essentially normal grossly. In the usual case of juvenile paresis several findings have been reported after gross study. These include atrophy, particularly in the frontal region, lepto- and pachymeningitis, thickening and infiltration of the pia, hydrocephalus, granular ependymitis, atrophy of the folia of the cerebellum with extreme gliosis and usually some diminution in the size of the cerebral hemispheres. The cerebellar changes have been considered as very important findings. As may be seen, none of these gross findings was found in the case under discussion. In the present case the meningeal response was practically absent. Likewise astrocytic proliferation in the present case was not marked whereas it is common in the usual juvenile paretic brain. No fat was found in the cortex here as contrasted with the probability of a large quantity of fat in the usual juvenile paretic brain. Iron deposits, common in general paresis cases, were likewise not found here. In addition, the present case presented a finding which is not usual in cases of juvenile paresis, namely the glia nodules. These, which were a general feature of the present case, served somewhat to differentiate it from the usual juvenile paretic case. In addition, the cerebellar changes seen in juvenile paresis were

not present in the case under discussion. We may recall that there was no atrophy of the folia, no marked gliosis, no reduction in the granular layer and white matter and there were no binucleated or trinucleated Purkinje cells which are frequently reported in the juvenile paretic brain.

On the basis of these differences in association with the clinical considerations, it was considered that the findings pointed more to either some unusual form of encephalitis or more probably to some form of polioencephalitis. One must emphasize here, however, the great difficulty in making a differential diagnosis in this case on the basis of the histological findings alone. Most neuropathologists, on being presented with histological preparations of the cortex in this case, would probably have made an initial diagnosis of juvenile paresis. Histological findings here, while differing in the ways enumerated above from those seen in the usual case diagnosed as juvenile paresis, were nevertheless not sufficient, when considered alone, to rule out the probability of a juvenile paretic condition. The nonspecificity of the lesions found in general paresis has been also pointed out by Wertham,[4] who described similar changes in the brains of chickens with spirochetosis. It was only when these findings were taken in conjunction with the clinical course and findings in this case that a definite ruling out of juvenile paresis was made.

All of the findings of the case have been reported in epidemic encephalitis. As is well known, practically anything may be found in this condition. The involvement of the white matter with the perivascular infiltration of lymphocytic type and the glia nodules are characteristic findings of cases of epidemic encephalitis. Although changes in the gray matter similar to those found in the present case have been described in cases of supposed epidemic encephalitis, it is by no means usual to find such changes, especially in the degree in which they were found here. In this case the involvement of the cortical gray matter was much more severe than that usually seen in epidemic encephalitis.

There is, however, one great difference between the findings in the present case and those usually seen in the typical case of epidemic encephalitis. As is well known, one of the sites of predilection of the pathological process in epidemic encephalitis is the

basal portion of the brain, particularly the diencephalon and mesencephalon and in the latter the substantia nigra. In the present case, although these regions were involved to some extent, the pathological changes were exceedingly less in intensity than would be expected in the usual case of epidemic encephalitis, especially where involvement of the cortex had proceeded to such a degree.

The diagnosis which we prefer, namely a polioencephalitis, was made on the basis of the predominant involvement of the gray matter and on the basis of a very similar case described by Guillain, Mollaret and Bertrand.[5] The case described by these authors was that of an eight-year-old child in excellent health until the onset of the disease. The onset was likewise embodied in a transformation of his character and subsequent disturbances of gait in which the child occasionally fell down. Later there was a disturbance in language and comprehension and at the same time a diminution of vocabulary. Various abnormalities of the motor system, deliria and attacks of agitation occurred. A Wernicke aphasia was considered likely. The neurological examination revealed only slight abnormalities. Four months after onset a febrile reaction developed associated with marked changes in muscle tonus. Later a very definite catatonic syndrome developed. Finally, tendon retractions with extensions of the head and muscular rigidity occurred and the boy died six months after the onset of the condition. Grossly, the brain seemed normal except for some congestion of the meninges.

Histologically the authors classified their case on the basis of the nerve cell changes, the perivascular reaction and the microglia nodules with predominance of the findings in the gray substance throughout the nervous system and with integrity of the myelin, as a case of polioencephalitis. They differentiated it from Economo's disease on the topographical distribution of the lesions. On the basis of their clinical symptomatology they felt they were dealing with a progressive, destructive, acute process in the brain.

The findings in our case resemble to a great degree those in the case of Guillain, Mollaret and Bertrand. In both cases the clinical course of the disorder was essentially the same. There was a febrile reaction in both cases. The rather insidious "mental" onset with

the rapid progression throughout a period of six months to general motor and possibly sensory phenomena with a fatal issue appeared very similar in both cases. Pathologically, there is perhaps even greater similarity in the cases. In both cases one was dealing with a process which could best be described as a polioencephalitis with evidence of inflammatory and degenerative processes. In both cases the vascular system was involved to a considerable degree, especially in the cerebral gray matter and the white matter immediately underlying the deeper layers of the cortex. In both cases there was perivascular infiltration, predominantly of the round cell type, as well as an apparent actual increase in the number of small blood vessels in the cortex. In both cases there was severe involvement of the ganglion cells, particularly of the cortex, but in general throughout the brain. These changes varied from simple swelling to acute cell disease and disappearance of the nerve cells with a satellitosis and neuronophagia. The process in both cases was marked in the deeper layers of the cortex where there were numerous acellular areas with marked disturbance of lamination. Rod cells were numerous in the cortex of both cases and the glia nodules, which were a feature of our case, were present also in the case of Guillain, Mollaret and Bertrand. In both cases the differential diagnosis involved primarily a consideration of juvenile paresis or of some form of encephalitis such as encephalitis lethargica. However, on the basis of the clinical course, the serological studies and the absence of certain more or less characteristic pathological changes in the nervous system and the topographical distribution of the lesions, both of these conditions were ruled out in both of the cases. In our case the involvement of the spinal cord was perhaps slightly greater than that described in the case of Guillain, Mollaret and Bertrand. In our case the glia nodules were present throughout the white matter of the whole spinal cord. They were not mentioned as occurring in this situation in the case of other authors.

Conclusions.

1. A case is described of a nine-year-old boy presenting clinically a syndrome indicating general involvement of the central nervous system and progressing with a febrile reaction to a fatal termination

within a few months. The various conditions considered in the clinical diagnosis included juvenile taboparesis, some form of encephalitis, brain tumor, Schilder's disease and early multiple sclerosis.

2. Pathologically the case presented evidences of a progressive inflammatory as well as degenerative process involving predominantly the gray matter of the brain and the white matter in close proximity to this. The pathological process involved predominantly the smaller blood vessels of the cortex, the ganglion cells and the microglia. The blood vessel changes included perivascular infiltration with round cells and plasma cells, increase in the number of cortical capillaries and some endothelial proliferation. The nerve cell changes varied from slight swelling to acute cell disease with disturbance of the lamination, satellitosis and neuronophagia. The microglial changes included transformation into numerous rod cells and the formation of numerous nodules distributed throughout the entire nervous system, including the spinal cord. There was no predilection of the pathological process for the mesencephalon or basal portions of the cerebrum.

3. On the basis of rapidly progressive clinical course, the negative serological findings, the presence of numerous nodules throughout the nervous system and the absence of meningeal and cerebellar changes, a diagnosis of juvenile taboparesis was considered unjustified. Some form of leuco-encephalitis was ruled out because of the normal findings in the myelin sheath preparations. Encephalitis lethargica was considered unlikely because of the absence of predilection of the process for the mesencephalon, particularly the substantia nigra.

4. This case points out the difficulty of establishing a correct diagnosis on the basis of the histological findings alone inasmuch as the pathological aspect of this case, in the absence of a clinical history, might have justified a diagnosis of juvenile paresis.

5. Because of the marked similarities on both the clinical and pathological aspects between this case and one described recently by Guillain, Mollaret and Bertrand, the diagnosis similar to theirs, namely acute polioencephalitis, was made. This seemed justified in light of the pathological findings in the case involving predominantly the gray matter throughout the nervous system.

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DISCUSSION.

DR. COYT HAM (Columbia S. C.).—The presentation of this paper to which you have listened is an additional link to the endless chain that enables us as medical men to span the chasms and avoid many of the pitfalls, thereby making life safer for future generations.

Each additional bit of information brightens the pathway and makes the traveling easier for those who are to come after us. Regardless of how keen an observer one might be, linked with present-day perfected laboratory technique, problems are encountered, in all fields of medical endeavor, and especially so in the field of neurology which it is utterly impossible to solve clinically even after all means at hand have been exhausted.

The paper for discussion deals principally with the histopathological aspect of one particular case. This report is full and complete in every respect, and the co-workers are to be commended for the amount of work done.

Were it possible to view the various anatomical structures during life as we are able to do grossly at necropsy and subsequently microscopically, the whole problem of making a correct diagnosis would be much simplified. Since this is impossible, we of necessity must rely on the symptoms presented, correlating experience with facts, taking into consideration the information obtained by others.

The probability of failure to make a correct diagnosis is a negligible factor in the case of juvenile paresis with our present-day serology test, which is not infallible but reasonably accurate, in the hands of a skilled technician. Encephalitis in any of its forms is an entirely different proposition. The serology, though of value to a certain extent, supplies us with little, and in many instances, no positive information. Therefore, one of necessity must rely primarily on the clinical picture. The neurological findings when present are quite variable, frequently changing from day to day, and even from hour to hour.

The statement though remote is of value, the substance of which is that the secondary skin eruption of syphilis may simulate the eruption of any of the common skin diseases. So it is in a case of encephalitis. The symptoms may

simulate those of any neurological condition, varying as the disease progresses, depending on the location and severity of the involvement, and in some instances presenting no tangible information.

In earlier days we have heard that in a febrile case where there is no demonstrable pathology, guard with suspicion the possibility of encephalitis. This is my admonition since no one has as yet attained perfection in any branch of medical science. It is only through wholehearted cooperation, giving to the world the benefit of our experience, and by so doing gradually and progressively uncovering some of the yet unsolved mysteries of the pathological processes that take place in the human body. Who knows the predilection of disease or the predispositions of the particular human mechanism? The latter perhaps is as variable as the seasons or as numerous as the human race.

Due to the prevalence of syphilis, this condition must be considered and ruled out in all cases where the central nervous system is involved. In this particular case under discussion, the fact that it was evident from a clinical aspect that there was involvement of the spinal cord, the gray matter and substratum, the whole picture is overshadowed.

Had there been an epidemic of encephalitis lethargica when this boy became sick, I have no reason to doubt that the situation would have been immediately visualized. Sporadic outbreaks are the cases that give one the most difficulty, and were it not for the fact that new problems arise occasionally, progress in medical science would come to an end.

DR. DIOMEDE GUERTIN (Marlboro, N. J.).—In reading over the history of the case described by Guillaine, Mollaret and Bertrand in "La Revue Neurologique," and hearing the report of the case as described by Drs. Ferraro, Barrera and Gregory, I have been amazed by the manner of appearance of the symptoms.

It reminds me of a rainstorm that has begun very lightly, abating the dust first, then increasing in intensity and making the road muddy, finally becoming torrential, reaching the flood stage and putting in evidence the structural damage.

The abating of the dust corresponds in both cases to the change observed in these children's school work, a "falling off" so to speak. As the intensity of the disease increases, the boy's writing becomes illegible, he loses his way to school, shows mental confusion in answering questions, and "acts dumb at home," while the French girl shows a speech disturbance, a decrease of comprehension, a narrowing of her vocabulary to the point of finally being able to utter only monosyllables. As the storm becomes torrential and reaches flood stage, spasticities alternate with flaccidities, the colonic discharges become more pronounced, to eventually reach a degree of generalized tetany.

These two cases so similar in symptomatology and histopathology, observed at such a distance one from the other, have shaken down in my mind the concept I acquired—I know not where—about the peculiarities of encepha-

litis in particular sections of the world. I mean the Van Economo encephalitis; the St. Louis outbreak; the Japanese encephalitis of Tokaji and Kobayaski; the Austrian "X" Disease; the acute serious encephalitis of Brown and Simmers; the acute toxic encephalitis of Grinker and Stone, etc.

At any rate, it would certainly seem apropos for the sake of the victims of such a baffling and devastating disease to centralize all of this material into one research sanctuary if we are ever to find the causative agent and the curative plan of attack.

A second point of interest to me is the fact that the mental symptoms were the first signs to be detected in both cases, thus, perhaps, adding a feather to the neurological basis of mental diseases.

ABSTRACT OF "ONE HUNDRED YEARS OF NON-RESTRAINT." *

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AND

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It was in 1837, just a hundred years ago that Robert Gardiner Hill, an obscure 26-year-old physician, had the temerity to suggest that it might be possible to conduct an institution for the insane without having recourse to the employment of any instruments of restraint whatsoever. He had but two years previously been appointed house surgeon to the Lincoln Lunatic Asylum, where with the approval and support of Dr. Edward Charlesworth, visiting physician to that institution, he was able to test his ideas in practice. A year later he reported the success of this innovation by delivering a lecture at the Mechanics' Institution of Lincoln, titled, "The Total Abolition of Personal Restraint in the Treatment of the Insane." The intellectual ripples set in motion by this report were destined to reach the shores of every civilized land, and ultimately to profoundly affect psychiatric practice all over the world. Accordingly, it will be particularly fitting to celebrate this centennial by tracing the evolution and progress of this movement, and perhaps also to rather critically analyze our contemporary attitude to this century-old humanitarian principle.

PART I.

In order to adequately appreciate the advanced nature of Hill's proposals at that time, one must have some idea of the general status of the care of the insane in England in the early nineteenth century. To be sure, there were isolated institutions such as the York Retreat, founded by William Tuke in 1796, in which a truly humanitarian régime was already in vogue. Nevertheless, in the great majority of the British asylums, wretched conditions still

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

prevailed. Several scandals regarding these matters had finally forced the Commissioners in Lunacy, a specially appointed government bureau, to issue reports in which they told about hospitals in which patients used to be thrown into cells without heat, or the most elementary sanitary conveniences; about extreme overcrowding; about the unspeakable filth and dampness; about the common use of chains and manacles, often resulting in the abrasion of tissues extending down to the bone; how in a certain provincial hospital it was the custom to tie the patients to their beds and to lock them up from Saturday evening until Monday morning, so that the personnel could enjoy their Sunday rest. As late as 1844, quiet and disturbed patients, clean and untidy ones, were all grouped together. Instances of chronic starvation were also disclosed, and everywhere the Commissioners found unheated corridors, frigid rooms, ragged linen, intolerable noise, confusion, and stenches. Patients disappeared and no one knew how or when; from the register of the dead, at times, as many as 300 names were transferred into the register of the improved. Everywhere there flourished falsified accounts, graft, etc. During an investigation by a certain committee, which took its work seriously, an attempt was made to burn up the whole institution with its patients, books and records. Fortunately, the plot was only partially successful, and only the administrative offices were burned down.

In 1815, Samuel Tuke (grandson of the famous Quaker reformer), spurred Parliament into an investigation of the notorious Bedlam. A detailed report was made in the House of Commons which disclosed that the patients there were chained to the walls, dressed in rags and barefoot; next to patients that were entirely demented, dirty and untidy, there were kept others who were still quite sensible and even highly cultured. In solitary cells, lying on the bare floor, or perhaps bedded on straw, there were found naked women, covered with blankets full of holes. In one of the cells of the men's division was found a strong, energetic man named Norris. He had on one occasion struck an attendant and consequently he was fettered with a long chain, one end of which was passed through a hole leading to the next room. From there, his oppressor, the attendant, could drag the patient as close to the wall as he desired, simply by shortening the chain. Norris had lived in such slavery for 12 years, and died within a year after he was released.

Such were the conditions in England when Hill and his fellow workers Charlesworth and Conolly began their campaign for reform.

PART II.

Edward Charlesworth was Hill's superior officer as he held the position of visiting physician in Lincoln. He laid the foundation for Hill's work by promulgating the following regulations for the new mental hospital which was opened in that city in 1821. First, that a strait-jacket could be used on a patient only on the specific prescription of a physician. This in itself meant a great deal, since before that time any attendant could have a patient tied up, and could keep him tied for days, weeks, and even months. Furthermore, Charlesworth made it a rule that each piece of paraphernalia for restraint—whether handcuffs, strait-jackets, or belts—was to be kept in a specially designated place on a hanger, so that it was always possible to ascertain immediately how many were in use at a certain time. And lastly, he specified that each instance of the use of restraint was to be registered in a special book. With the installation of these precautions the use of restraint in the Lincoln Asylum had naturally become more and more limited. Thus, when in 1838 Hill read his epoch-making paper on the "Total Abolition of Personal Restraint in the Treatment of the Insane," he already could cite the 16 years' experience of Charlesworth in support of his arguments.

In this paper, Hill proclaimed that restraint could be entirely dispensed with if in its place were substituted:

1. "Classification and watchfulness.
2. Vigilant and unceasing attendance by day and by night.
3. Kindness, occupation, and attention to health, cleanliness and comfort; and
4. The total absence of every description of other occupation of the attendants."

The activities of Charlesworth and Hill soon provoked widespread attention in British psychiatric circles. Numerous physicians began to visit Lincoln to study the new advances there. Most prominent among these was the newly appointed director of the asylum at Hanwell, John Conolly. He was most favorably impressed with what he saw and soon became convinced that the measures that had

succeeded so well in Lincoln could just as profitably be applied in his larger 800-bed institution at Hanwell. No doubt he also heard of the following incident which had actually happened in 1829. A patient in a strait-jacket who had also been strapped to his bed died suddenly during the night. Consequently, an order was issued that every restrained patient was to be constantly attended. The attendants grew tired of having to watch patients all night long and began to leave more and more patients unrestrained. It soon became apparent that restraint was not nearly as necessary as was formerly imagined.

About his own experience Conolly writes: ". . . . I entered Hanwell as a physician on June 1, 1839 . . . . here, too, the attitude of the physicians was the same as in other insane asylums. However, the agitation about such a problem as abolition of restraint, a measure accepted from time immemorial as an obligatory part of everyday asylum management, created a new situation and the use of restraint immediately became lessened. After the first of July, the number of instances of daily use of restraints, which upon my orders had to be reported every day, did not exceed 18—a comparatively small number in a hospital of 800 patients; after the 31st of July, their number never exceeded eight, and after the 12th of August it was limited to one only, and since September 12, restraint has not been used at all." In the new system it was replaced by attendants holding the patients' arms, and by isolating disturbed patients in separate rooms which at times were padded.

Conolly's ideas were widely discussed, both in medical journals and in the lay press. A questionnaire was sent to all hospitals, and very interesting results were obtained. A few of those questioned expressed themselves as in favor of absolute non-restraint. Their reasons may be summarized as follows:

1. Mechanical restraint degrades the patient in his own opinion, paralyzes his internal self-confidence, and thus impedes his recovery.

2. Experience proves that institutions which do not use restraint are comparatively quiet.

3. Mechanical restraint demoralizes the personnel, who tend to employ the same to avoid the conscientious fulfilling of their duties.

4. The patient may be controlled as effectually without mechanical restraint as with it; and that the only requisites for enabling the superintendents of asylums to dispense with the use of mechanical restraint are a greater number

of attendants, and a better system of classification amongst the patients; and that the additional expense thereby incurred ought not to form a consideration where the comfort of the patients is concerned.

Unqualified opposition to non-restraint was not brought to light by the questionnaire of 1842. However, there remained a group of physicians who considered it advisable to reserve the right to use restraint, in certain extreme cases. They gave the following reasons for their opinion:

1. Light restraint makes it possible to influence the patient quickly and to instill in him the necessary regard for rules made for his own benefit.

2. Supervision of patients, especially in large hospitals, is entrusted to attendants who are not always trustworthy, and are apt to lose patience quite quickly in dealing with a very disturbed patient. In such cases, moderate restraint is a better guarantee of the safety of all concerned, as well as insuring undisturbed rest for the other patients.

3. Frequently physical restraint irritates the patient less, and is less exhausting to him, than holding of his arms, or isolation in a separate room, where he has an opportunity to continue raging for hours.

4. Sensible use of light restraint, especially in cases of extreme excitement, has the advantage that it does not interfere with taking the patient on walks in the open air.

5. Enforced isolation in a small room is restraint, too, albeit in a different form, and its moral influence is just as unfavorable as that of mechanical restraint.

From a study of such questionnaires, visits to hospitals by the commissioners themselves, discussions of the problems in scientific societies and in the press, opinion became crystallized as we find it expressed in the eighth report of the Commissioners in Lunacy, released in 1854: (Tuke, p. 228-229).

For ourselves, we have long been convinced, and have steadily acted on the conviction, that the possibility of dispensing with mechanical coercion in the management of the insane is, in a vast majority of cases, a mere question of expense, and that its continued or systematized use in the asylums and licensed houses where it still prevails must in a great measure be ascribed to their want of suitable space and accommodations, their defective structural arrangements, or their not possessing an adequate staff of properly qualified attendants, and frequently to all these causes combined. . . . .

Gradually the leavening influence of the ferment contained in Hill's and Conolly's ideas began to permeate through the continent. In 1851, Stimmel, who had familiarized himself with non-restraint while in England, decided to make a similar experiment in his

private sanitarium in Könnenberg. However, he found it to be a failure, and consequently he warned his colleagues against undue enthusiasm for British innovations. A few years later there appeared two articles by Dick who, although he did not entirely subscribe to Conolly's views, nevertheless pointed out the necessity for regulating the use of restraint. Non-restraint found its next active German protagonist in Caspar Brosius, who read a paper on the subject at the meeting of the Natural Scientists in Karlsruhe in 1858. This event was rather laconically reported in the "Algemeine Zeitschrift" as follows: "Brosius defended non-restraint—however, the unconditional use of such a system was not sympathetically received by the majority; it is felt that its origin is linked with the peculiar historical, political, and social conditions in England." A year later Brosius translated Conolly's book, "The Treatment of the Insane without Mechanical Restraints" (1856), and this deserves great credit for acquainting German psychiatrists with the British observations and therapeutic successes.

The most confirmed advocate of the non-restraint idea in Germany was Ludwig Meyer. It was characteristic of him that as a student at the University of Bonn, he was forced to leave because of his participation in the Revolutionary Movement of 1848. With his first position of authority, as head of the psychiatric department of the city hospital at Hamburg, Meyer introduced many practical reforms in accord with Conolly's ideas. He ordered the removal of strait-jackets, restraint chairs, belts, etc., from the wards and corridors. Meyer thought that if restraint measures were permitted in an institution at all, then they always managed to sprout new and frequent variations. Meyer's innovations did not find much support. It was a source of great satisfaction to him when, in 1864, he succeeded in opening, at Friedrichsburg, an entirely new psychiatric institution built according to his own plans. In a short time it had earned the appellation of the "Oasis of Non-restraint" in Germany. One of Meyer's favorite ideas was that a psychiatric hospital in its construction should differ in no respect from a general hospital. To the end of his life he was a fighter. When once, during the program of a session of the German Psychiatric Society, there was included a paper titled "The Problem of a Non-restraint System," Meyer stopped attending the meetings because he considered that such a problem no longer existed.

The third indefatigable agitator for non-restraint in Germany was Griesinger. He first experimented with the system in a small hospital in Zurich, and later applied it in the Charité at Berlin where he was abetted by his brilliant young protégées, Westphal and Jastrowitz. The first issue of the newly founded "Archiv für Psychiatrie" began with an article on non-restraint by Griesinger. Here are some excerpts from this article—also some related statements from his "Pathology and Therapy of Mental Diseases:"

Yes, the problem is now solved entirely in favor of the system of non-restraint. This great reform has been introduced into all the English public institutions for the insane, its success is apparent, and Conolly's name will forever occupy an honored place beside the name of Pinel, whose work he completed. . . . .

In the period of the first edition of this textbook, I was still under the influence of the arguments of German psychiatrists against the system of non-restraint; in my heart I was sympathetic to the reform, but was unable to overthrow the arguments raised against it. Since then, experience itself has overthrown these arguments from one end of England to the other; I myself have seen the use of this system in a few large English institutions, and have become completely convinced. It is true that I occasionally saw a bloody nose in an institution of over a thousand patients, and heard the crash of broken glass; but the same things occur, as everyone knows, also in places where the strait-jacket and restraint chair are in daily use. . . . . In Hanwell, with a population that eventually reached a thousand patients, there wasn't a single patient tied up, either during the day or at night, for a period of 21 years. . . . . Bedlam and St. Luke's Hospitals, which admit acute cases mainly, have long since adopted the system of non-restraint, and it has become a true blessing for these institutions which were previously in such a forlorn state. Not one institution that has adopted the new system has had to return to the former methods of treatment and restraint. It is absurd to say that in the system of non-restraint the use of isolation belongs in the same category as the strait-jacket. Among the five to six thousand patients in various British institutions, Morel found only three patients in isolation, and these remained there for only short intervals. Let them compare this figure with the number incarcerated in cells in continental institutions, ... let them compare further the number of patients kept in strait-jackets, and then let them presume to regard the system of non-restraint as an empty dream. Of course, the assertions that this system is more applicable to Englishmen, who are better accustomed to subordinate themselves to legal authority, than the Continental Europeans, are also groundless. Prior to Conolly's time in England too, they were convinced that the insane could not be managed without energetic restraint measures. Prior to 1843, in Bedlam and St. Luke's Hospitals, innumerable patients were chained to the walls on account of their alleged unmanageability. Finally, it is time to stop asserting that the use of restraint is beneficial but that the abuse of it only deserves op-

probrium. Who may say where abuse begins in restraint? Actually, abuse is simply unavoidable in these cases. As Conolly has put it, "Restraint is equivalent to neglect."

These pages aroused considerable debate in Germany. Griesinger was supported by the younger psychiatrists, while the older generation, in the main, was against him. Tigges attempted to prove the therapeutic value of the "jacket." Many reproached the advocates of non-restraint, saying that they poisoned their patients by the excessive administration of narcotics. Neymann said as to this: "One ties up the arms and the legs and the other ties up the brain and its peduncles. But why the first is a rotten physician and humanitarian, and the second a wonderful physician and humanitarian, I do not quite understand." Some adherents of the non-restraint school accepted this challenge, and immediately stopped the administration of narcotics; it became clear that it was possible to get along very well without them.

Finally, at the 1879 Conference of German Psychiatrists in Berlin, there took place an open struggle between the two sides. Laehr, Nasse, Muller and Edel expressed themselves in favor of the permissibility of restraint in the principle. In this group, surprisingly, we also find Brosius, who, to some extent, had retreated from the idea of absolute non-restraint. Griesinger at that time was already dead, and the followers of non-restraint were headed by Westphal. The arguments led to no definite decision. The committee chosen by the conference sanctioned the use of the strait-jacket only in certain exceptional cases. This, however, was in itself a major step forward, and in the succeeding years, the ideas of Conolly become more and more accepted in German psychiatric institutions. Strait-jackets were one after another discarded from the inventories and some of them were relegated to museums.

In Switzerland the issue of non-restraint was decided positively as early as 1868. At the Conference of Swiss Psychiatrists at Reinau, Kramer read a report which was followed by the adoption of a unanimous decision to abolish all mechanical restraint in Swiss institutions.

In Holland the system of non-restraint became generally accepted in 1874, as a result of the strenuous agitation of Rayner and Van der Kapelle. In Denmark, the practice of non-restraint was introduced by Guberts in 1882.

In the United States, mechanical restraint apparently had not been abused to the same extent as in Continental Europe. However, its ultimate disappearance was correspondingly slower—thus an investigation made in 1886 still showed as many as 5.4 per cent of the patients being subjected to mechanical restraint.

Oddly enough, the most backward country in Europe in regard to this reform during the latter half of the nineteenth century was France, the native land of Philip Pinel. Intensely proud of his name, French psychiatrists attempted to prove that everything worth while had already been accomplished by their great compatriot. Consequently, in the main they ridiculed the idea of non-restraint and devoted their attention rather to designing improved forms of strait-jackets. Only Morel, who translated Conolly's book in 1860, and Lunier, were advocates of non-restraint during this period. Consequently when Serbsky, the famous Russian psychiatrist, visited Charenton in 1885, he was led to express his impressions as follows:

> . . . . the departments for the disturbed patients present a most peculiar spectacle: On entering, one might think that he had happened upon one of the quietest wards because there is no noise or commotion apparent. Only upon looking more closely does one begin to grasp what is wrong; along the covered galleries surrounding the inside courts are rows of chairs to which the trunks, arms and legs of the disturbed patients are fastened by means of belts. In addition, many patients are locked in separate rooms, wherein they are tied to chairs or beds. So many restrained patients I had seen nowheres else—and least of all would one expect to find this in Paris, just two weeks after the unveiling of Pinel's statue.

PART III.

From the above historical sketch it would appear that the question of non-restraint is now a dead issue, and has been a dead issue for at least the past four decades. For have not the principles first set forth by Hill been universally accepted by psychiatrists since the close of the last century?

However, as a matter of actual fact, is this the case? Let us at once admit that theoretically at least, the use of any form of restraint has become definitely tabooed in all modern mental hospitals. Then let us frankly review our daily procedure and see how far we have permitted our practice to diverge from the ideals we profess to follow. Perhaps the narration of a true anecdote will

serve to emphasize the points we are trying to make. In submitting his daily report at the completion of his tour of duty, a young ward physician wrote about a patient who had become extremely maniacal, destructive, and assaultive and who was consequently sent to the acute ward and placed in neutral wet packs "as a measure of necessary restraint." The superintendent on reading this made no comments or suggestions as to other ways of handling the situation, but corrected the quoted phrase to read "as a measure of sedative hydrotherapy." The superintendent then remarked good-naturedly that, "We do not use restraint in our hospital." William Seabrook in his recent best-seller "Asylum" comments rather pungently on the layman's reaction to such evidences of the psychiatrists' inveterate compulsion to change the names but not the natures of things. Seabrook says in speaking of the institution in which he was committed:

> The place reminded me increasingly of my mother who believed that by changing the name or appearance of a thing, you could make the thing different—usually better or less worse. A rose by any other name never smelled just as sweet to her. It always smelled sweeter. She was changing sauerkraut into liberty cabbage long before the sinking of the Lusitania. A skunk was a wood pussy, and hash became I-don't-remember-what by the addition of a sprig of parsley.
>
> This was not hypocrisy. It was her sincere if sometimes naive contribution toward making the world happier and brighter. I had affectionately supposed her to be old-fashioned, but I now found the same system at work in this highly scientific, extremely modern institution.
>
> It still seemed to me somewhat naive, as, for instance, the fiction that we were in a hospital. We all knew the sort of place we were in, and spoke freely about it among ourselves—sometimes humorously and sometimes bitterly—yet always without embarrassment or pretense, but Spike soon cautioned me not to say "college" or "hatch" where any of the doctors or nurses might overhear it. He said it made them feel embarrassed.

And he goes on:

> And so I learned about the mysterious "pack" which is the only method of prolonged physical restraint now regarded as cricket by modernized institutions which can swear without perjuring themselves that they have thrown all the strait-jackets, handcuffs, and muffs out of the window. "Pack" bears the same relations to "strait-jacket" that "mental hospital" does to "insane asylum." It is up my sainted mother's alley. It is a rose by any other name. It is my dear, dead mother's liberty cabbage.

We do not wish by these remarks to create the impression that we uniformly condemn the use of neutral wet packs as simply dis-

guised forms of restraint. We feel that when they are properly applied and adequately supervised, neutral packs are distinctly sedative in character. However, we affirm that as they are routinely being used in many instances in some of our best regulated hospitals, they *are* disguised forms of restraint and thinly disguised at best. When it is necessary for from four to six husky attendants to exert all their physical powers to place a frantically resistive patient in a pack, and when the procedure is repeated three to six times a day, day in and day out, for months on end, without any detectable change in the patient's condition, or in his reaction to the "treatment," such "treatment" is certainly being misguided and misapplied. The continuous presence of a physician supervising such "treatment" does not lessen its essential inhumanity. If after the first few applications of a pack, the patient does not learn to accept it passively, we feel that he is unsuited for such measures, and no benefit can be obtained from their continuance. We do not consider it wise or humane to pack a patient more or less continuously, simply because he is persistently mischievous, or annoying, or irritating to other patients, and thus is likely to provoke assaults on himself or others. We would certainly prefer to see such cases handled with the less popular measures of chemical restraint or judicious segregation, and if necessary, isolation. When facilities for hydrotherapy are limited, we feel that it is unwise to habitually employ the packs, to immediately "take out of circulation" patients who have just committed an assault or other antisocial act. This practice creates the general impression that they are being employed as a punitive measure, and consequently causes them to be viewed with disfavor and resentment by other patients who may actually need their sedative influences. I can recall a youth with dementia præcox who was periodically impulsively assaultive, and who was consequently receiving a series of neutral packs. He remarked to me how much he preferred the procedure at a previous hospital where, after he had attacked a fellow patient, he had been punished by being only restrained with wristlets. When I tried to explain to him that the packs were not being administered as "punishment," he grinned knowingly and said, "Quit your kidding, Doctor."

We haven't time to mention in detail the situations in which we feel the use of measures such as neutral packs are definitely indicated. Certainly they often exert a decided sedative influence on

patients with pronounced masochistic trends, feelings of guilt and desire for punishment. No doubt they also sometimes permit an outlet for the satisfaction of certain sadistic trends which some psychiatrists may otherwise have difficulty sublimating. Nor do we care to elaborate our impression that the benefits of such "restrictive hydrotherapy" has in general been generously exaggerated. We feel that the physical factors of heat, increased perspiration, etc., possess in themselves the main benefits and wonder if in most cases equally good results could not be obtained from the use of these elements alone and without the restriction.

Bleuler's opinion of wet packs certainly merits quoting:

> Occasionally, they also have a soothing effect. But if the arms are not wrapped up, they are not tolerated for long, just by those patients who need packs most; and if they are put under the blanket, this procedure, according to my way of thinking and that of my patients, becomes, under the guise of medicine, the worst means of restraint that exists. I therefore avoid packs as much as possible.

So in conclusion we may state that almost any measure of therapy, when injudiciously used, may become a measure of restraint. This is doubly true when it concerns such methods of restrictive hydrotherapy as neutral packs. The fact that one hundred years after the enunciation of the non-restraint principle, mechanical restraint of this type still finds daily use in many modern mental hospitals, may be ascribed to the psychiatric (I almost said psychotic) habit of wishful thinking, which leads us to say we see no evil, simply because we no longer *hear* of the strait-jacket, or *smell* the old asylum stenches. Again we have permitted ourselves to become callous to human suffering because of the age-old excuse of practicality and economic necessity. It is time that we rededicated ourselves to the proposition of Robert Gardiner Hill that we should primarily strive for a régime in which the moral influence of the physician and well-trained attendants takes the place of all restraint measures. And we must remember that the primary requisites for such a régime are still adequate physical accommodations for the patients and adequate personnel, and that, as it was so aptly put in the Report of 1844, "the additional expense thereby incurred ought not to form a consideration where the comfort of the patients is concerned."

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DISCUSSION.

DR. HENRY L. KLOPP (Allentown, Pa.): It has been definitely worthwhile for Drs. Messinger and Amdur to review 100 years of non-restraint in the treatment of the mentally ill for the benefit of The American Psychiatric Association.

My experience covering the years following 1895, or in other words, 42 years, enables me to clearly comprehend the said history. Within the 42-year period, I have passed through the transition of non-restraint, including seclusion.

I have been guilty within the first 17 years of my work in connection with the Westboro State Hospital at Westboro, Massachusetts, to use mechanical restraint in all forms, as well as that of locking patients in sheathed rooms with double doors and a heavy oak window guard. At the time I organized the Allentown State Hospital at Allentown, Pennsylvania, as a new institution in 1912, I decided that no mechanical or chemical restraint or seclusion should be resorted to.

The use of continuous flowing neutral baths as well as that of neutral therapeutic packs was begun in my Massachusetts experience. Naturally, at Allentown this was fully developed so that today we have in the said institution 35 specially designed continuously flowing neutral baths, with prospects of additional buildings, one of which will have a battery of two tubs.

I have been opposed to the use of therapeutic neutral packs other than in extreme cases. On the men's service, there are many days when no such packs are used. On the women's service, this fluctuates from three to twelve, in a population of an average of 838 women. It is my opinion that in extreme cases, when carefully applied under proper supervision, such packs are of definite therapeutic benefit and should not be considered restraint.

From actual experience I know that the use of neutral packs can be abused and become restraint. For example, in my early experience in Allentown I discovered that the nurses instead of removing the patient in accordance with instructions, namely, not to exceed three hours, were tricky, some of them, and poured water from a bucket over the sheets so as to keep them wet. Naturally, a dry sheet pack has no therapeutic value and is restraint.

I am passing around the form that is used at Allentown for this purpose. If the said order is faithfully carried out, there should be absolutely no abuse.

I do not know what the reaction of this association may be regarding the use of the combined therapeutic neutral pack with that of placing the patient in the pack in a continuous flowing neutral bath. We have found this very efficacious. Of course, this is not used other than in extreme cases.

It is my opinion that canvas hammocks with a canvas cover fastened over the patient to the side of a tub is just as much restraint as the author's contention in regard to the use of neutral packs.

During my 25 years at Allentown I have not permitted the use of this procedure. I am not concerned as to the position of the patient in a neutral bath, whether sitting, reclining or across with the legs over the side of the tub. If my memory serves me correctly, Dr. Earl D. Bond, of the Pennsylvania Hospital, made a study of the effects of the neutral baths upon the patient, and found that it mattered little as to the actual position of the patient, that it was equally effectual in the sitting as well as in the reclining posture.

In the paper, reference is made regarding the use of solitary cells, "lying on the bare floor or perhaps bedded with straw." I have always been thankful for the experience that I have had at Allentown with a dearth of single rooms. For example, in a prolonged service population of 1256 beds, there are only 12 single rooms, six for men and six for women.

On the turbulent women's wards, the population approximates 140 beds and there are no single rooms. The installation of four continuous flowing neutral bath tubs has very comfortably taken care of our prolonged turbulent women in that ward, and the same applies regarding a somewhat similar ward.

In visiting institutions, I have in mind one where patients were locked in single rooms with nothing more than a blanket to cover their bodies and even to lie upon, others with a mattress on the floor. I have seen canvas muffs and strait-jackets hanging upon the edge of the chairs ready to be applied if the patient became disturbed. Conditions of this kind naturally indicate that such an institution is still living in the days of 100 years ago.

I was particularly pleased with the statement that institutions who do not use restraint are comparatively quiet. I would add both mechanical and medical. I take delight in taking state inspectors and officials about the institution at night, so as to emphasize the quietness of the wards, and to show that continuous flowing neutral baths are used not only in daytime but also at night.

I should like to emphasize that this applies especially to institutions that do not use chemo-restraint in the form of hypnotics and sedatives. I do believe that chemo-restraint does not lessen disturbance. I have had rather interesting experiences within recent months. A general hospital surgeon asked what to do with a surgical case with drainage. The patient was very much disturbed. He felt that he should not be sent to a mental hospital. He had been given various prescriptions of hypnotics and sedatives.

I asked the surgeon to discontinue all these, and to have the nurse place the patient in a therapeutic neutral pack. In three and one-half hours, the

surgeon called back and expressed his gratefulness for the recommendation, stating that the patient had been greatly benefited thereby.

In another case, for a patient in a general hospital who was much disturbed I made a similar recommendation. Therefore, the patient was not brought to us, although there had been an appeal to bring this about. I am mentioning these cases to emphasize that there is a therapeutic value in neutral packs if properly applied.

I want to emphasize at this point that the more that is done for the individual disturbed patient, the greater the result. Such cases, occupied through occupational therapy by a therapist who is versatile not only in daily activities but in recreation and diversion in the form of music, reading, bean bag, medicine ball, and so forth, are greatly benefited.

It is the duty of the superintendent to give thought to doing everything possible for his patients. By so doing, there will be a decided lessening of turbulence and of destructiveness.

I have been impressed that in the keeping of a weekly record of destructiveness of men and women patients with a constant check-up, it is thereby kept at a minimum. All these things are factors in the lessening of the number of patients that require active treatment either in the form of continuous flowing neutral baths, and especially therapeutic neutral packs.

Recently I visited an institution in one of our Southern states where I observed for the first time the use of armchairs with a board across the arms, locked on both sides to the arm of the chair, which prevented the patient from leaving it, and at the same time serving as a table for the food tray. The Superintendent is gradually eliminating this type of restraint.

I am emphatically in accord with the author's statement that when therapeutic packs are properly applied and adequately supervised, they are distinctly sedative in character. Patients from time to time, when they recognize that they are on the verge of a period of excitement, request to be placed in a therapeutic pack.

Patients who are brought before the medical staff for pre-furlough review, are asked as to their reaction not only as to the application of the therapeutic pack, but also that of continuous flowing neutral baths. Invariably, their comment is to the effect that these were beneficial in their treatment.

This subject requires persistent and continuous vigilance. There is no doubt but that the influences of the attending physicians and supervisors, equally with that of the well trained nurses and attendants, are requisites in the elimination of all restraint measures. Well trained graduate registered nurses with tactful personalities are decided factors in this.

If the neutral pack is controlled, conscientiously used, and properly applied, it is of definite therapeutic value; otherwise, as the authors state, it becomes "disguised restraint."

THE PHARMACOLOGICAL "SHOCK" TREATMENT OF CHRONIC SCHIZOPHRENIA.*

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I. Introduction.

In the literature on the subject of pharmacological shock treatment of dementia præcox, both in this country [1] and abroad,[2] very favorable results are reported insofar as cases of six months to one and a half years duration are concerned. With few exceptions, however, the experiences of the various investigators, particularly in this country, with the so-called chronic cases have been disappointing. It is a well-accepted fact that the efficacy of any therapeutic measure, specific as well as symptomatic, varies inversely with the duration of the illness and that, therefore, fewer cures should be expected in cases of long standing. It is equally true that the success or the failure of any treatment depends upon how well it is carried out, and in the case of the so-called "insulin shock" therapy on whether one uses the Sakel treatment or merely induces a hypoglycemic state. It is the purpose of this paper to report the results of the treatment of chronic schizophrenia by the Sakel method, and to discuss and emphasize those steps in the procedure which we consider of greatest importance in the treatment of this type of case. The space at our disposal does not permit discussion of the psychological implications.

Our experience with this therapy covers the period of nine months ending September 1, 1937, during which time 52 male patients were treated, in whom the average duration of psychosis was 4.1 years. We were fortunate in having throughout this entire time at our disposal the services of Dr. Sakel, or his associate, Dr. Dussik, who have most generously aided and advised us. We take

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this opportunity to express our profound appreciation and gratitude for their assistance, advice and encouragement, which have been of inestimable value to us.

II. Terminology.

It has been the observation of the writers, both in reading the literature on this subject and in discussions with others engaged in this work, that different terms are used to describe the same conditions or different meanings are ascribed to the same terms, with the result that there is little common basis for comparison of experiences and results of treatment. For our own purposes we have arbitrarily adopted certain terms and definitions which we shall mention here in order to clarify our subsequent discussion.

"Shock."—This term is used by Sakel [3] in a generic sense to indicate the reaction to the pharmaceutical agent employed. He distinguishes between "dry shock" and "wet shock," the former being used to designate the epileptiform convulsive seizure, and the latter to designate the comatose state produced by hypoglycemia.

However, we have chosen to dispense with the use of this term because of the apparent general unfamiliarity (in this country) with its meaning as defined by Sakel. For example, some have understood "shock" to mean the early symptoms of hypoglycemia such as those observed in accidental insulin overdosage in the treatment of diabetes. Others have considered it only as a state of coma produced by insulin. Furthermore, it is not clear that the term "shock" accurately describes the biological changes in the organism as a result of the introduction of large doses of insulin.

We prefer instead to use more specific terms which cannot be so easily misinterpreted, such as the following:

"Hypoglycemia."—This term is used to designate the period of time between the injection of insulin and the administration of carbohydrate.

"Coma."—We have chosen to consider under this heading three major levels or degrees of unconsciousness, namely light, moderate and deep coma. The patient is considered to have reached a light state of coma when he is unconscious to such a degree that he remains out of contact with his environment no matter how much he is stimulated, though he may respond by purposeless or defense

movements, and retains all superficial reflexes. This condition is to be sharply differentiated from the states of somnolence and stupor observed in the earlier hours of hypoglycemia, from which the patient can be easily aroused to a more or less complete contact with his environment.

"Moderate Coma."—In this stage the patient has lost his superficial reflexes, the one most easily tested being the lid reflex. The normal plantar response has been replaced by the Babinski, and in the upper extremity the Hoffman sign is present. These pathological reflexes, however, are not fully reliable indicators of the depth of coma as they are sometimes found in the light coma and even in the stuporous stages. A more reliable indicator of the depth of coma is the corneal reflex, which becomes more sluggish as the depth increases.

"Deep Coma."—In this stage there must be, in addition to the loss of superficial reflexes, at least a constantly absent corneal reflex and a more or less constricted pupil. As the coma approaches its ultimate depth there is complete areflexia. This state is not often attained no matter how long the time nor how large the dose of insulin.

III. Reaction Types.

Generally speaking, the reactions noted are of three separate types, any one or all three of which the patient may exhibit at different times during the course of his treatment. These three types are:

(A) THE UNCOMPLICATED COMA.

This is the reaction most often encountered. Here the patient, after passing through the successive stages of somnolence, diaphoresis, restlessness, muscular twitching and stupor, reaches the state described above as light, moderate or deep coma, from which he can ordinarily be easily aroused by tube-feeding of a sugar solution. Where the response is slow or incomplete in this method of termination the patient invariably responds promptly to intravenous glucose administration. This is the "wet shock" of Sakel.

(B) THE CONVULSIVE SEIZURE.

This reaction type has been erroneously regarded by some as one of the more dangerous complications of hypoglycemia, but in our experience it has been followed by definite improvement often enough to make it a desirable reaction in some cases and therefore it was not and is not to be considered a complication. In our cases roughly 75 per cent had one or more convulsions during the course of treatment, and some of these patients showed a definite tendency to frequent repetition of the seizure. The convulsive seizure should be clearly differentiated from the severe clonic muscular contractions so often seen early in the hypoglycemic state, and also from the tonic muscular spasms in the later stages of hypoglycemia. The clonic muscle twitchings often occur while the patient is conscious, there is no tonic phase preceding it, and no cyanosis is seen. In order to be considered a convulsion the seizure must show a definite epileptiform sequence, namely, the tonic spasm preceded in some cases by the so-called epileptic cry, followed by the clonic phase, cyanosis, and frequently by biting of the tongue and incontinence. Nearly all such convulsions occur within the first 2½ to 3 hours ("dry shock") when the patient is in a light coma or in the deeper stupor immediately preceding the onset of coma. When they occur later in the period of hypoglycemia the patient has not progressed beyond the stage of light coma. We have never seen a convulsion occur during the stage of deep or moderate coma, but Sakel has described such late convlusions which he considers definite complications. The convulsion *occurring in the first three hours of hypoglycemia* may be terminated by gavage only, and without the use of intravenous glucose, in most instances. Some writers have looked upon the severe clonic muscle contractions described above as a pre-convulsive state and, erroneously, as an indication for termination of the hypoglycemia in order to prevent the occurrence of the seizure. Such a procedure has no place in the proper management of hypoglycemia. As mentioned above we consider the convulsion a desirable occurrence in some cases, and in our experience it has been definitely not harmful in any case. Furthermore we do not believe that the clonic muscle contractions indicate that convulsion is impending, because it is a reaction that many

patients show without developing convulsions. We have also noted that a number of convulsions occur without a preceding phase of clonic contractions.

(C) PROLONGED COMA, EXCITEMENT AND ORGANIC CLOUDED STATE.

The uncomplicated coma reaction, which is most usually seen, is easily terminated by the administration of carbohydrate. There are instances, however, which in our experience have become more frequent as the depth of coma and the period of hypoglycemia have been increased, where patients do not respond even when intravenous glucose is given. In such cases the comatose state persists for hours or days in spite of the fact that the hypoglycemia no longer exists, and in fact has been replaced by hyperglycemia and glycosuria through the administration of large amounts of carbohydrate. While it is not possible always or even often to foretell which patients are about to show this type of reaction, it is usually preceded by a comparatively long period of hypoglycemia and a deep coma state as evidenced by absent corneal and superficial reflexes, a sluggish or absent Babinski or even complete areflexia. The pupillary reaction here is of great significance. Ordinarily during the early stages of hypoglycemia the pupil tends to be more or less dilated while the lid and corneal reflexes are very active. As the coma deepens the pupil becomes smaller until in the deep coma states it actually may be pinpoint and fixed, which is one of the most reliable single indicators of deep coma. While many patients who show this pupillary sign do not develop the prolonged coma state, it has invariably been present in those who did. At about the time that it is becoming apparent that the patient does not respond as expected to the administration of intravenous glucose the pupils suddenly become widely dilated. (Thus the pupillary reactions would seem roughly to parallel those observed in the third and fourth stages of ether anesthesia.)

It has also been observed that in these cases there has usually been evidence of involvement of the medullary centers, especially that of respiration, occasionally in the form of Biot or Cheyne-Stokes type of breathing, but more often as a beginning central respiratory failure. This is usually seen as shallow, slow, irregular, cog-wheel breathing with incomplete aeration and cyanosis. This

is a much more dangerous condition than the loud stertorous respiration, which appears more alarming and which is more likely to be observed by reason of its nature.

Coincident with the wide dilatation of the pupils following the administration of intravenous glucose there is a gradual decrease in the depth of the coma, associated with a period of marked increase in the rate and depth of respiration, the patient using all his accessory muscles. He is also very restless, shows marked opisthotonus at times, and there is constant motion of the entire body in a wholly dissociated and purposeless manner, to the extent of requiring considerable manual restraint in order to keep him in bed. These periods usually last about 10 to 15 minutes followed by intervals of the same or shorter duration when he is less active and respiration is less labored. The pulse is extremely rapid and frequently irregular, subsiding somewhat during the periods of relative quiescence. On several occasions the pulse rate has been as high as 200 per minute while the respiratory rate has risen to 80 per minute. The blood pressure during the quieter periods is little affected. The temperature, which is usually subnormal at the time of termination, rises sometimes to 105 degrees (F.) during the first few hours. The symptoms described above generally continue from one-half hour to several hours depending upon the severity of the reaction, and are followed by a milder phase of excitement not associated with respiratory disorder and of a constant rather than episodic nature. During this latter phase the patient is no longer in coma as a rule, but rather is stuporous and can be aroused and usually can take liquid nourishment. This stage may last from a few hours to (in rare instances) a few days, to be followed by complete disappearance of the symptoms or by an organic clouded mental state with confusion, disorientation, impairment of memory, mental fatigue and difficulty in thinking and concentration which may persist for days or weeks.

In view of the fact that the syndrome described above seems to be so inordinately severe it may be surprising that we have considered it as a reaction type rather than as a very dangerous complication, which it was indeed thought to be when we first encountered it. However, even in the most severe of these reactions that we have seen, there has not been any demonstrable permanent damage to the central nervous system of the patients concerned, and

on the other hand there has been almost universally observed a definite improvement in the mental state, which has seemed to be directly proportional to the severity of the reaction. By way of illustration let us cite briefly the first instance of the appearance of this syndrome, which was one of the most severe we have seen. In this case the patient, who had been grossly psychotic and a resident in this hospital for three years and who had been exhibiting gradually increasing personality changes for a number of years prior to his admission, developed this syndrome on the eighth day of treatment on a dose of 80 units of insulin. Following the subsidence of the acute symptoms, the clouded state persisted for a period of about two months, and as the patient gradually emerged from this organic mental reaction it became apparent that he was recovered from his psychosis. He has for several months continued entirely symptom-free and has adjusted well in the community. As a result of this and subsequent similar reactions with beneficial effects, and particularly since we now believe that the duration and severity of the symptoms can be controlled by the intravenous administration of crystalline vitamin B_1, we no longer consider the syndrome as a grave complication, or very dangerous when properly handled, but instead often attempt to produce it in certain cases. The treatment which we have found to be most effective in controlling this condition is in most cases symptomatic, with the addition of vitamin administration. The first stage is best managed with the aid of manual restraint in order to prevent injury and to reduce as much as possible the extra burden upon the cardiovascular system. One milligram of vitamin B_1 (250 international units) is given intravenously as soon as the reaction is well established, together with additional intravenous glucose. If necessary, the vitamin may be repeated after a few hours. We have sometimes used sedatives such as barbiturates in combination with pyramidon for the restlessness. For the cases of extreme excitement morphine may have to be used, together with atrophine because of the occasional tendency to develop pulmonary edema. Because of the patient's condition he is at first unable to take nourishment and therefore must be tube-fed. At times it is necessary to supplement this by hyperdomoclysis of normal saline and 5 per cent glucose solutions, which besides supplying additional carbohydrate, serves to combat the fluid loss and lowered blood chloride level, and to

reduce the hyperpyrexia. Where the signs of respiratory failure are marked, in this and other situations, we have found the intravenous administration of coramine of greatest value, especially as it serves as a very effective cardiac stimulant also. In a small number of cases we observed the gradual development of an organic clouded state not preceded by the acute stages described above. In these patients the clouding persisted throughout the remainder of the course of treatment and slowly cleared during a period of weeks thereafter.

IV. Statistical Results.

The clinical material upon which this study is based consists of 52 male patients treated at the Harlem Valley State Hospital during the nine months' period between December, 1936, and September, 1937, comprising a total of 2587 individual treatments. The first group of patients was selected only on the basis of the willingness of the patient's family to permit the treatment, in order to make possible the demonstration of the technique of insulin therapy by Sakel. When a surprising number of these patients responded very favorably to the treatment the next group was chosen from patients with a much more favorable prognosis and the results obtained were correspondingly better. We felt, however, that if the treatment was to be of any real value in state hospitals, its effectiveness in the so-called deteriorated and ordinarily hopeless cases of dementia præcox must be demonstrated. For this reason fully 50 per cent of the cases here reported were taken from this latter group, so that the most severe possible test of the efficacy of the treatment might be made. Even in these the results were most gratifying.

All of the cases included in this report were officially diagnosed dementia præcox, all four sub-classifications being represented.

Before offering the tabulated results of treatment it is well to indicate the criteria used in evaluating the mental status of the patient at the end of the treatment. The terms "recovered," "much improved," "improved," and "unimproved" were chosen because they were already in general use in the New York State Hospitals. In order to be classified as "recovered" the patient must have become entirely symptom-free and must have developed insight re-

garding his illness. By "insight" we mean that the patient must fully realize that he had suffered a mental illness and that his symptoms were in fact a part of this illness. He must also be able and willing to speak of his illness in detail and objectively, and with normal affect, and he must be able to adjust well in the community at his pre-psychotic level. The term "much improved" means that the patient is entirely symptom-free but that insight as defined above is lacking or incomplete, although he is able to adjust well in the community at or near his pre-psychotic level. The patient is considered "improved" if his symptoms are incompletely alleviated but less distressing so that he is able to make a definitely better adjustment than before treatment. "Unimproved" is applied to those patients who derived little or no benefit from the treatment.

It was difficult in many cases to estimate the results of treatment with accuracy according to the above definitions, but where doubt existed as to the exact status of the patient we have always taken a conservative course and classified him in the group where his inclusion could not possibly have been contested. In a great many instances we have had to revise our original estimates during the months following treatment. Sometimes this revision placed the patient in a lower group than the one originally decided upon, but in by far the greater number of cases it resulted in his advancement to a better classification, thus amply justifying our belief that we have been consistently conservative in our judgments.

TABULATED RESULTS.

From the figures in Table 1 it will be seen that in this group of 52 *chronic cases*, most of whom had a very poor or hopeless prog-

TABLE 1.

Number of cases treated	52	
Shortest duration of illness before treatment	1	year
Longest duration of illness before treatment	17	years
Average duration of illness before treatment	4.1	years

Recovered	6 or 11.5 per cent
Much improved	15 or 28.8 per cent
Improved	22 or 42.3 per cent
Unimproved	9 or 17.4 per cent

nosis, 82.6 per cent were definitely benefited by insulin therapy. In 21, or 40.3 per cent, of these cases, complete disappearance of symptoms occurred following the treatment. If these figures are compared with the reported rates of spontaneous remissions the value of the Sakel treatment of chronic schizophrenia cannot be questioned. For example, Lewis and Blanchard,[4] in their analysis of 100 recovered cases of schizophrenia, found that the duration was less than one year in 80 cases, about one year in 14 cases, approximately two years in six cases, but that in none of these spontaneously recovered cases was the duration longer than two years. Also, Whitehead,[5] in reviewing the spontaneous remission rate in 90 cases of dementia præcox, found that no recoveries occurred in cases of

TABLE 2.

	Recovered.	Much improved.	Improved.	Unimproved.
1 to 2 years (8 cases)...	3 (37.5%)	3 (37.5%)	0	2 (25%)
2 to 6 years (32 cases)..	3 (9.4%)	10 (31.3%)	15 (47%)	4 (12.3%)
Over 6 years (12 cases)..	0	2 (16.7%)	7 (58.3%)	3 (25%)

a duration greater than six months, while in those of duration greater than 18 months none were much improved and only 23 per cent were improved.

In Table 2 the results are tabulated to show the relationship between the condition following treatment and the duration of the illness at the beginning of the treatment, because we believe that this is one of the most important prognostic considerations, and also because we feel that therapeutic results cannot be accurately compared unless they are evaluated on the basis of duration of the illness.

V. Technique.

It is not our purpose here to discuss in detail the whole technique of the Sakel treatment, for a description of which the reader is referred to the several communications of Sakel, Dussik and others, but rather to emphasize only those points in the procedure which apply particularly to the treatment of the chronic cases.

It became apparent early in our experience that the original technique had to be modified in order to obtain best results in cases of long standing. For instance, it was stated by Sakel[3] that in the

case of catatonic stupor hypoglycemia should be interrupted at the point of greatest activation, and in catatonic excitement at the point of greatest sedation. For the paranoid and other types coma was recommended. This plan of treatment was developed on the basis of experience gained with predominately acute cases, but we found that all chronic cases, regardless of type, required the most prolonged and deepest possible coma states that can be induced. The various steps in our procedure are directed toward attaining this end.

In the matter of insulin dosage it has been our policy to increase as fast as the patient's physical condition will permit in order to induce coma at the earliest possible moment. In the average robust individual this increase, beginning with an initial dose of 20 units, varies from 12 to 20 units daily until the optimum dose has been reached. The occurrence of convulsions during this initial phase of the treatment in no way alters our procedure, the rate of increase being maintained after one day of rest following the seizure. The optimum dose, once reached, is generally maintained throughout the treatment, occasionally being raised further because of the development of tolerance of insulin, but almost never being reduced in these chronic cases. Treatment is always ended abruptly without gradual reduction of dosage.

In our experience there has been no relationship whatever between the size and weight of the patient and the amount of insulin required to produce coma. On the other hand patients who ultimately responded best to the treatment required considerably smaller doses as a rule than those who showed little or no therapeutic response. From the reactions observed in our cases it would seem that the response of the individual patient to insulin remains much the same after a certain dose has been reached, and that further increases do not appreciably alter this response. For example, one patient reached a state of very light coma on a dose of 100 units and further increase to over 200 units failed to carry him to a deeper level. When the dose was abruptly reduced to 100 units his response remained exactly the same. Another patient, who had reached a state of deep coma on 120 units, was given by mistake 140 units with no appreciable change in his reaction. In cases where it was impossible to produce deep coma, no matter how much insulin was given, we adopted the plan, with very good results, of

extending the time of the individual treatment period to five or six hours, and occasionally longer where the patient's condition permitted.

The average duration of treatment has been 40 to 50 injections, the maximum being 73 injections. In some cases it was possible to obtain excellent results in less than 20 treatment days. We have not extended the treatment period beyond the indicated maximum because of uncertainty as to the effect of such long continued use of the drug. However, we have no reason to believe that treatment over even a much longer period would be harmful to the patient.

In some instances when treatment was discontinued because of this arbitrary time limit and where there was little or no improvement in the mental condition of the patient at the time of discontinuing treatment, we were at first inclined to consider such a result as failure and were preparing to give the patients a second course of treatment. However, after the rest period of two or three months recommended by Sakel, a very marked improvement was noted in many of these patients, in some instances so great as to make possible the patient's parole as much improved or even recovered. Thus our experience has borne out Sakel's oft repeated statement that the maximum improvement may not be attained for some months after treatment is discontinued—the delayed improvement or "ripening."

By far the most troublesome problem in the management of the individual treatment, and probably the most important single reason for failure to carry the patient to his optimum coma level, is the occurrence of disorders of respiration of various kinds. While it is true that a severe laryngospasm may occur and make necessary the immediate termination of the hypoglycemia, this is a very rare complication the management of which is obvious. It is with the common respiratory difficulties, which are apparently a normal response to the hypoglycemia and a phase through which nearly every patient passes as he approaches the deeper coma levels, that we are concerned here. Reference has already been made to the loud stertorous type of breathing, which because of its nature may appear alarming but which actually should not be so considered. In most cases it is due to mechanical obstruction of air passages and can be entirely relieved by changing the position of the patient and by aiding in the removal of mucus in the mouth and pharynx.

Mild spasm of the larynx and pharynx have been almost invariably relieved by the introduction of the nasal tube, which is left in place throughout the remainder of the treatment period. Another common type of respiratory difficulty is the episodic rapid labored breathing in which the patient uses all his accessory muscles of respiration and which is associated with extensor spasm of the extremities, a rapid pulse, moderate cyanosis and often with transient dilatation of the pupils. By itself this is not an indication for termination of hypoglycemia, because of its episodic nature and because usually it tends to disappear entirely as the depth of coma increases. Still another type often seen is the asthmatic breathing, which is usually not severe and also tends to be episodic in nature. Occasionally this may become so severe as to call for immediate termination of the hypoglycemia. In a few patients there are at times definite instances of acutely developing pulmonary edema which naturally call for immediate termination by intravenous glucose. The most serious of all these complications is the insidiously developing central respiratory failure, which is mentioned above, because it is associated with no obvious warning signals and therefore may be overlooked. Also it may develop after the termination of the treatment and before awakening, at a time when the patient is not, as a rule, watched as carefully as during the active treatment period. We cannot emphasize too strongly the necessity for continued close observation until the patient has fully awakened, particularly since this respiratory failure may be further complicated by rapidly developing severe pulmonary edema.

Cardiovascular complications, in our experience, have been extremely rare. Every patient during each treatment period shows at different times various irregularities of rate, rhythm and volume of the pulse, which may change rapidly from one type to another, apparently due to the antagonistic action of the sympathetic and parasympathetic systems. These are considered as normal reactions and of little or no significance, particularly when they occur early in the treatment period. A consistently rapid pulse in the later hours of treatment, however, may indicate beginning cardiac fatigue and therefore requires careful watching. There has been only one instance of cardiac complication so severe as to necessitate discontinuing the treatment. In this case there was auricular

fibrillation which lasted for several hours after termination on two successive days. We have not observed any severe allergic reactions. There have been no fatalities thus far.

VI. Conclusion.

Let us say in conclusion that we are firmly convinced of the value of this treatment. It is true that the results, while vastly superior to the spontaneous remission rate, still leave much to be desired. At the same time it must be remembered that fully half of the cases herein reported were considered before treatment to be hopelessly psychotic and apparently deteriorated, while the remainder with few exceptions had a very poor prognosis. In this way we have given this therapeutic method an exhaustive test, and with much better success than was anticipated. In the future we hope to be able to report a much higher remission rate by selecting cases not quite so hopeless, and by further improvements in our therapeutic technique by the addition of other pharmacological agents as adjuncts.

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OBSERVATIONS IN THE HYPOGLYCEMIC TREATMENT OF 55 CASES OF SCHIZOPHRENIA.

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Since the introduction of the hypoglycemic treatment of schizophrenia by Dr. Manfred Sakel into this country, reports and statistics have been appearing and accumulating in the literature reflecting the interest aroused in this form of therapy. It is the purpose of this paper to add to this series of reports by reviewing a group of 55 cases treated at the Buffalo State Hospital from March 8, 1937, to December 1, 1937.

From personal observations and from reports in the literature it is felt that variations in results obtained by workers can be attributed in a large measure to a lack of understanding and interpretation of both the technique and results obtained. In this series of cases the principles and procedure of the treatment as taught by Dr. Manfred Sakel were adhered to with but slight modifications.

Preparation of Patients.

In view of the experimental nature of the treatment and of the presence of a definite element of danger, written consents are obtained in all instances for the treatment in which release of responsibility is noted for any untoward results. All patients are subjected to the following routine:

1. A blood chemistry including urea-nitrogen, non-protein nitrogen and blood sugar.
2. Red cell count, white cell count and differential count.
3. A complete and thorough physical examination.
4. Complete urinalysis.

Factors Considered in the Choice of Patients.

Because of the large number of consents obtained for this form of treatment, the following factors have influenced the selection of our cases:

1. Patients whose duration of psychosis has been less than two years.

2. Patients who prior to their psychosis possessed a fairly stable and well organized personality.

3. Treatment has in many cases been restricted to those patients whose relatives are both willing and able to care for the patients at home if improvement is brought about.

4. Schizophrenic cases of undisputed diagnosis have been preferred.

Contra-Indications for Treatment.

1. Pancreatic or hepatic disease.
2. Cardio-vascular disease.
3. Active pulmonary tuberculosis.
4. Renal disease.
5. Absence of good superficial veins should have some bearing in the treatment. Experience has shown that where ready access to the venous circulation is absent, mortalities can and do occur particularly in emergency situations.
6. Active menopause. In our series two cases who were undergoing active menopausal changes were treated. In both cases the administration of intravenous glucose became imperative in order to arouse them from coma. On occasions their conditions became quite critical. It is felt that the injection of insulin into individuals undergoing profound glandular changes is fraught with considerable danger.
7. Temperatures ranging above 100.

Technique Employed.

The four phases of treatment as outlined by Dr. Sakel were followed with but slight variation. Phase one consists of the building up stage during which initial doses of insulin, varying from 15 to 25 units, are increased by 5 to 20 units daily depending upon the reaction of the patient. These increasing doses are continued until the shock dose is attained. An attempt is made so to regulate the dose as to produce a coma two hours following the injection. Injections are given at 7.30 a. m., breakfast having been omitted. The hypoglycemic state is terminated at the end of 4 or 5 hours. During the second phase of the treatment the patient is given daily shock doses of insulin over a period of weeks. The third

phase constitutes the rest phase. In our experience we have felt it advisable to allow the patient to have from one to two rest days per week and oftener as indicated in individual cases. The final phase or phase four consists of a gradual tapering off of the insulin doses. During this phase the patient is never allowed to go into coma but hypoglycemia is terminated two hours after the injection.

Methods of Termination of Hypoglycemia.

During the first phase of the treatment the hypoglycemic state is readily terminated by the patient drinking a solution of cane sugar. When coma has been induced, the hypoglycemia is terminated by gavage using a warmed cane sugar solution. The intravenous method of termination is resorted to when the patient fails to respond to the gavage method one hour after its use. There are occasions of an emergency nature when immediate termination becomes imperative. Such occasions in our experience have been sudden collapse associated with pulmonary œdema. These cases, however, respond quite readily to injections of adrenalin and large amounts of intravenous glucose. Stertorous breathing, bronchospastic breathing, severe clonic and tonic spasms are not indications for termination; on the contrary, in some cases they are desirable. In our series epileptic seizures occurring both early and late during hypoglycemia have not been indications for termination. The apparent value of epileptic seizures occurring early and late in hypoglycemia is reflected in the accompanying tables.

Criteria for Termination.

Sakel has emphasized the importance of terminating the coma at the proper moment, insisting that the success or failure of the treatment depends on the intelligent management of this phase. Such termination tends to fixate the patient at the particular mental and physical state present at the time of the administration of the sugar. It should be emphasized that there are no hard and fast rules that can be established regarding the point of termination. It is only through experience and constant observation of the reaction of patients undergoing this treatment that one becomes able to sense the proper or psychological point of termination. In the treatment of this group of patients certain principles have been followed. They have been adhered to as long as the results have

been satisfactory but have been varied in numerous instances with fairly satisfactory results.

1. Depressed, mute and inaccessible cases, whose duration of psychosis has been less than one year are terminated at that point where they become active and noisy. Frequently, as the patients approach profound hypoglycemia prior to coma they have been observed to become more talkative, alert and active. In most cases, however, deep coma has been found desirable.

2. Excited and over-active cases of short duration are quickly terminated at that point in hypoglycemia where they become quiet and less excited. If unsuccessful, deep coma is resorted to.

3. Patients displaying a marked paranoid trend have invariably been carried into a deep coma. In old chronic cases a profound depth of coma is desirable.

4. Indifferent, indolent and apathetic patients are stimulated during phase 1 to the degree of producing irritability, resentfulness and even aggressiveness, and are quickly terminated at this point. All cases, however, are subjected at one stage or another to deep coma.

Observations During Hypoglycemia.

During the course of the treatment various phenomena are observed. Hitherto many of these reactions have been considered dangerous and to be avoided. The frequency and apparently favorable outcome in some of our cases have led us to believe that on the contrary they are not complications but should be considered as desirable factors. To bring out a better understanding of such reactions several observations will be considered.

The great majority of patients experience convulsive seizures during the treatment. These should not be considered complications but phenomena associated with insulin shock. They may occur towards the end of the first phase but are more frequently observed during coma. Three types of seizures are recognized:

1. Tonic spasms. Here the patient experiences severe tonicity of the entire body occasionally associated with opisthotonus.

2. Clonic spasms. These are first seen as twitchings about the lips and eyes. Gradually this spreads to the muscles of the face,

then the fingers, hands and arms and is soon followed by severe generalized clonic spasms involving the entire body.

3. Generalized epileptic seizures. These may occur during coma. Thirteen of our patients experienced such seizures during treatment. Their frequency in individual cases varied from one to nine. It has been our policy to allow patients to undergo such reactions without termination. In many of our cases it has been our observation that improvement frequently dates from such seizures. Where epileptic seizures occur treatment is omitted on the following day.

During the phase of coma (shock) one observes marked respiratory difficulties. Such difficulties are reflected in the stertorous and bronchospastic breathing frequently seen. Cheynes-Stokes breathing and episodic periods of hyperpnœa have also been seen but they are generally self-limiting.

Marked fluctuations and variations in the rate and rhythm of the pulse frequently occur and are not considered of consequence except when associated with a feeble pulse which had previously been of good quality.

Strabismus involving the external recti muscles was observed. This was particularly noted just prior to the patient entering coma but has never been observed subsequent to coma.

Two types of coma have been described by Dr. Sakel. These are the wet coma and the dry coma. In the former type the patient generally enters coma quietly and infrequently do epileptic seizures occur. In the dry type, however, where the patient does not perspire and where fluids appear to be retained in the body, epileptic seizures are more prone to occur.

Nursing Care.

Intelligent and alert nursing is an essential feature of the treatment. Before treatment instructions are given to the nurses relative to the proper nursing technique. Each nurse is instructed to notify the physician immediately of any emergency situation. These occasions are arrythmias, irregular pulse in rate and volume and when the pulse is below 45, severe tonic and clonic spasm of any part of the body, tongue biting, generalized epileptic seizures, beginning collapse, breathing difficulties, including Cheyne-Stokes, stertorous and bronchospastic breathing and laryngospasm.

Special hypoglycemia charts are furnished to nurses. Upon these charts is recorded exact information concerning the different types of spasms, their duration and frequency during each treatment. The duration of hypoglycemia and coma as well as the time of termination and the time of reacting is also noted. Variations in the mental trend from time to time are recorded.

Discussion of Observations.

Inasmuch as the mechanism and explanation of the treatment continues in the theoretical sphere no attempt will be made to explain the mechanism of the treatment other than to state that a physiological basis appears to be the most probable one. Dr. Sakel in his recent papers has attempted to theorize and explain the reactions on the basis of changes brought about in the cell body and the nerve pathway through the influence of insulin.

As will be observed in the accompanying tables the most favorable results have occurred in patients whose duration of psychosis prior to treatment was under two years. It can be assumed, therefore, that whatever changes have occurred in these schizophrenic patients are of a reversible nature and can be influenced by the insulin therapy. Such changes, however, become irreversible in patients whose psychoses are of longer duration. This latter group becomes more resistive to treatment and only occasionally does one secure apparent recovery.

Conflicting opinions concerning the relative importance of the insulin itself as compared to the psychological approach associated with the insulin therapy have been advanced. One worker reports on a series of patients that received the insulin treatment and a series that served as a control group. Both groups received the same nursing care. It was concluded that patients in the control series showed better improvement than those in the insulin group. Still another group of controls were used in conjunction with another series of insulin treated patients and here it was found that marked improvement occurred in the insulin group whereas the control group remained unchanged. Furthermore, the control group were later subjected to the insulin treatment and showed considerable improvement subsequently. It is just possible that variations in technique may have been a factor here. In the pres-

ent series the writer feels that a psychological approach or any psychotherapeutic measures were entirely or almost completely eliminated.

TABLES.

	No.	Paroled.	Returned.
Recovered (apparently)	12	12	2
Much improved	19	19	0
Improved	15	6	2
Unimproved	9	1	0
Total	55	38	4

Duration of Psychosis.

	1 yr.	1-2.	2-3.	3-4.	4-5.	5-6.	6-12.
Recovered (apparently)	7	..	1	..	3	..	1
Much improved	2	6	2	3	2	3	1
Improved	..	7	1	4	1	..	2
Unimproved	..	..	4	..	1	..	4
Total	9	13	8	7	7	3	8

Epileptic Seizures.

Name	No. of seizures.	Time of occurrence after insulin injection.	Result.	Paroled.
P. O.	2	2½-3½ hrs.	Unimp.	No
F. F.	1	3 hrs.	Unimp.	Yes
F. A.	2	2, 4 hrs.	Unimp.	No
W. S.	1	2 hrs.	Imp.	Yes
Q. L.	7	2-4 hrs.	Imp.	Yes
T. S.	1	1 hr.	Imp.	Yes
M. H.	9	2-3 hrs.	Imp.	Yes
F. T.	1	11 hrs.	Imp.	Yes
E. H.	1	2½ hrs.	Unimp.	No
W. K.	6	2½-3½ hrs.	Imp.	Yes
A. S.	1	3 hrs.	Unimp.	No
V. S.	1	2 hrs.	Imp.	Yes
H. C.	1	2½ hrs.	Imp.	Yes
M. G.	2	2 hrs.	Imp.	Yes

Continued blood sugars on our patients have disclosed the fact that each patient appears to have a minimum sustaining blood sugar level below which the blood sugar apparently never drops,

irrespective of the amount of insulin injected. The white cell count has been studied carefully in a series of our patients, 1, 2, 3, 4, and 5 hours subsequent to the injection of insulin. This has shown a gradual increase of the cell count to 27,000 with a relative increase in the polymorphonuclear count.

Although 40 injections can be considered as an average course of treatment some of our patients received as high as 73 injections. The number of injections ranged from 13 to 73. The length of the treatment is dependent upon the response or lack of response to the insulin injection. Where, however, there is no favorable response to a series of 40 injections improvement is not likely to occur.

Aphasia was observed in two cases but disappeared at the end of six hours.

Three cases who had shown no improvement at the termination of a course of treatments began to improve two to three months later and on two such occasions parole was effected.

The minimum shock-producing dose was 45 units. The maximum dose given was 450 units without obtaining coma. Three cases in our series were given from 400 to 450 units of insulin without bringing about a comatose state. It is felt that these patients are insulin-resistive and because of constitutional or endocrinal factors cannot be carried into coma. Such cases were stopped and the metrazol form of treatment instituted.

The maximum number of hours of hypoglycemia experienced by a patient was 268. The minimum was 38. The greatest number of hours in coma for an individual patient was 103. The minimum was 1 hour. Only two patients in the entire series failed to demonstrate spasms or seizures at one time or another during the treatment. The aggregate amount of units of insulin used in a single case during a course of treatment was 16,315, constituting the largest amount in any case.

Conclusions.

1. A series of 55 schizophrenic patients were subjected to the hypoglycemic therapy.

2. The duration of psychosis in this series of patients ranged from two months to thirteen years.

3. Thirty-eight patients showed sufficient improvement to warrant their parole. Four patients in this parole series have been returned to the hospital; ten have remained home seven months; six have remained adjusted for six months; eight continue their home adjustment for five months; the remainder range in their adjustment from four months to seven weeks.

4. Other than four cases of pharyngitis and tonsillitis occurring during the treatment no complications have resulted.

5. There have been no mortalities.

6. The occurrence of epileptic seizures during the treatment has in a majority of cases proved beneficial.

7. The catatonic form of schizophrenia responded best to the treatment. The paranoid form and the hebephrenic form are rated next in their response to the treatment.

8. Three patients at home have become worse but not sufficiently to warrant their return. Ten patients at home have continued to improve.

TREATMENT OF PSYCHOSES WITH PENTAMETHYELENTETRAZOL.*

By H. H. GOLDSTEIN, M. D., E. F. DOMBROWSKI, M. D., J. V. EDLIN, M. D., A. P. BAY, M. D., C. L. McCORRY, M. D., AND J. WEINBERG, M. D.

The use of convulsive agents to produce epileptiform seizures, as a means of treatment of schizophrenia and other psychoses, was based on the previous observation of Nyiro and Jablonszky that in cases of epilepsy combined with schizophrenia the seizures became less frequent or ceased entirely. Other authors felt that true epileptic seizures were so rare in schizophrenia that where they do occur doubt as to the accuracy of the diagnosis may be entertained.

Meduna [1] on the basis of such observations felt that some type of biologic antagonism existed between schizophrenia and epilepsy and attempted a therapeutic application of this idea by injection of a 25 per cent solution of camphor in oil intramuscularly for the purpose of producing a convulsive seizure. Finding that camphor was not ideally suited for this purpose, he sought other agents which would give a similar result in a more satisfactory manner. Pentamethyelentetrazol (metrazol) was found ideally suited for this purpose.

As a result of this therapy, in 43 of his patients, 19 were cured or recovered, 7 improved and 17 remained unchanged. In conclusion, Meduna stated that "The percentage of cures far exceeds the number of spontaneous remissions recorded in the literature."

Since Meduna's original article there have been several contributions to the literature, chiefly by European investigators. All of the articles thus far have definitely indicated that there is a larger number of remissions occurring on therapy than would be expected to occur spontaneously.

Therapy was begun at the Chicago State Hospital after a preliminary investigation of the methods used at the Research and Educational Hospital. There was no attempt made to select any par-

* From the Chicago State Hospital, Dr. Edward F. Dombrowski, M. D., Managing Officer.

[1] L. von Meduna: Archives of Neurology and Psychiatry, 35: 361, 1935.

ticular type of patient. One hundred and two patients were treated; of this number 34 were females and 68 males. Diagnoses by the staff of the institution were as follows:

Hebephrenic præcox	56
Catatonic præcox	25
Paranoid præcox	2
Schizophrenic type of psychosis in mental defectives	5
Manic depressive psychosis:	
Manic phase	3
Depressed phase	1
Chronic alcoholism with paranoid psychosis	1
Incompleted treatment	9

The technique and method of administration of therapy were altered somewhat from that described in the literature. Ladislaus v. Meduna [2] started with 5 cc. of a 10 per cent metrazol solution and used the same dosage until there was a failure to produce a convulsion after which the dose was increased 1 cc. No definite conclusion as to the number of attacks necessary to secure a remission was offered.

With the end in view of treating large groups of patients a ward was chosen with two adjoining rooms which could readily be screened so that patients waiting for treatment in the outer room would be unable to see the treatment in the inner room. The patients were prepared in the outer room and their beds were then wheeled into the inner room where two or three patients were treated simultaneously. They were then returned to the ante-room until such time as they had recovered sufficiently. In this way it was possible to treat 50 to 60 patients within one hour to one and one-half hours.

Patients are given 10 per cent metrazol intravenously. The rate of administration is important since the more rapid the administration the more easily convulsive seizures are produced. Males are given 5 cc. as the initial dose and females are given 4 cc. The dose is increased 0.2 cc. to 1 cc. on subsequent treatments depending upon the severity of the reaction produced. In some cases, the dose is not increased but maintained at the same level for several injections. This method of dosage-increase minimizes the necessity of more than one injection per convulsive seizure and was found to be safe in our hands.

[2] Ladislaus v. Meduna: Psycho-Neurol. Wchnschr., 37: 317, July, 1935.

Although with this increase of dosage a failure to produce a convulsive reaction is not frequent, it does sometimes happen; and we have found that it is possible to repeat the injection shortly afterwards. A rest of five minutes is usually sufficient to allow the patient's respiratory and cardiac rate to return to normal. No ill effects have been noted from repetition of doses.

Almost immediately following the injection of metrazol there may be a short cough, followed in a few seconds by blinking of the eyelids and a rigid, expectant, attitude of the patient. About 40 seconds after the injection, the patient develops a short clonic followed by a tonic convulsion. The body may assume one of several characteristic postures and the mouth is opened wide; in fact, opening of the mouth is so pronounced that subluxation of the temporomandibular joint is caused very frequently during this phase. Typical clonic convulsions follow the tonic seizure and differ from those of idiopathic epilepsy only in the severity of the seizure. Toward the termination of the convulsive reaction the patient becomes progressively more cyanotic until a deep cyanosis develops followed for a moment by apnea and a deep inspiratory action as the apnea ends. Patients remain unconscious for three to 10 minutes and then may remain confused for one-half hour to several hours. Marked excitement may either occur following the convulsion or replace the convulsive seizure. Evidence of marked stimulation of the motor cortex, spinal cord and sympathetic nervous system are manifested during the period of reaction to metrazol.

Although this form of therapy seems rather drastic when viewed for the first time, we have now given a total of over 4000 individual injections and have treated over 102 patients, without a single mortality. Complications as a result of the treatment are not uncommon. The complication seen most frequently was a subluxation of the temporomandibular joint, and was so common a complication that it came to be one of the expected results from therapy. Subluxations reduced themselves spontaneously in by far the greater number of cases; occasionally reduction was necessary and was always accomplished in the period of relaxation following the termination of the convulsion. The use of leather thumb guards enables one safely to reduce all cases which do not reduce themselves spontaneously.

The most severe type of injury occurring in the course of treatment was fracture dislocation of the humerus. Three such complications occurred in our series. All three fracture dislocations were of the right humerus and all of them occurred in male patients. Although fractures do occasionally occur in convulsive seizures of idiopathic epilepsy, they are exceedingly rare. The occurrence of such a complication suggests the force with which the muscles act during the seizure.

One of the fracture dislocations occurred in a patient who, on a previous treatment, had had a dislocation of the same shoulder. One fracture of the femur occurred in a patient for whom therapy was disapproved because of the compensatory strengthening of the right thigh in consequence of deformity in the left leg and foot. It is significant that all of our fracture dislocations occurred during the first treatment and that all of the patients who received no serious injury during the first treatment (except the patient who sustained the fracture of the femur) did not suffer any injury on subsequent injections.

Although a very careful study of cardiac, nephritic or other organic pathology following treatment could not be made, one patient showed a reaction which suggested that a study of the action of large doses of metrazol on cardiac muscle should be made. This patient after his last treatment complained of pain over the precordium; his pulse was somewhat irregular, and he vomited. He remained acutely ill for about 48 hours and then improved. An electrocardiogram suggested acute myocardial changes. This patient recovered from his psychosis, was discharged, secured employment and has been working actively since. Two months after his last treatment he had no complaints and his pulse was regular.

Apnea as a complication occurred in several patients at the termination of the convulsive seizure. Some patients developed a cyanosis reminiscent of the cyanosis livida of infants; although artificial respiration was resorted to on several occasions it seems to those observing the patients that respirations would have begun spontaneously. In all cases of mild apnea, respiration began with a deep inspiration without the aid of artificial stimulation.

Injuries to the mouth such as biting the lips and tongue, and injuries to teeth were rare, and with good technique it should be possible to avoid such injuries almost entirely.

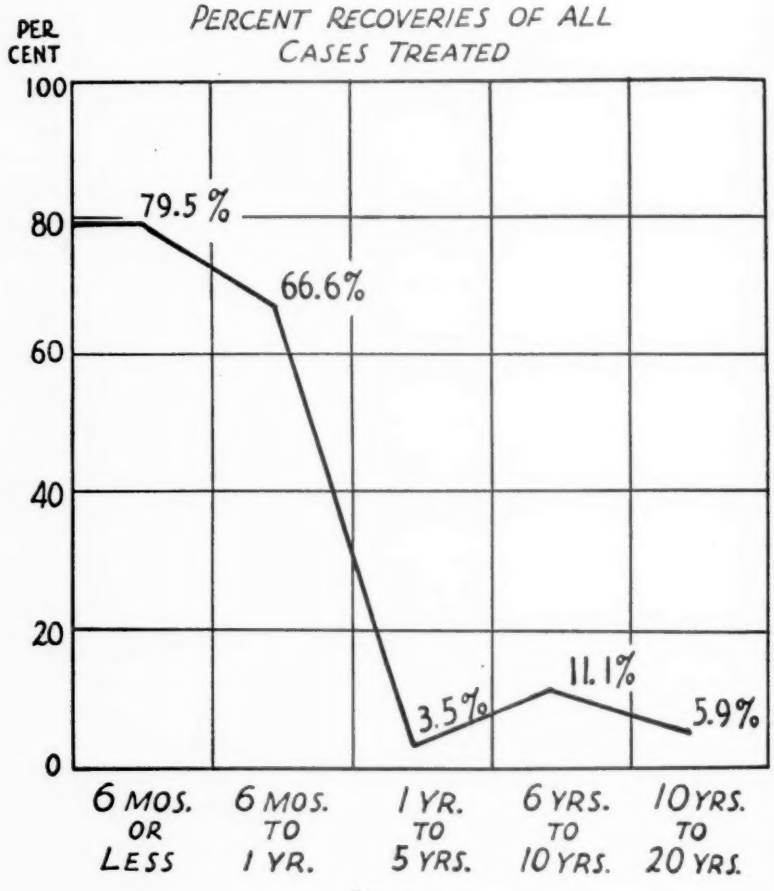
Patients were given two treatments weekly and treatment was discontinued if the patient had recovered or when a total of 15 seizures were produced. Some patients receive more than 15 seizures if it seems probable that they will be benefited by further therapy. Patients failing to show an improvement after having had ten seizures have a poor prognosis from the viewpoint of possible recovery or improvement on metrazol treatment. The least number of injections with recovery was four. The greatest number of convulsive seizures induced was 20.

The dramatic improvement made by patients under this form of treatment leads naturally to an enthusiasm which must be tempered by conservatism; still one cannot help but feel that something definite is being accomplished. An example of such improvement was the case of E. H., a patient who since admission had been seclusive, indifferent, actively hallucinating, and was diagnosed hebephrenic dementia præcox. After three treatments objective symptoms disappeared and he showed increased interest in his surroundings. After five treatments the patient was actively engaged in working about the institution, affect was normal and his insight complete. After discharge from the institution, the patient returned to work and has been working since. Many similar histories might be cited.

Certain factors of importance have been noted in connection with this therapy. The duration of the psychosis is of great importance and cases of shorter duration are more apt to show recovery or improvement. Ladislaus v. Meduna [3] stated that in those cases treated within six months after the first manifestation of the disease, there is 80 to 90 per cent probability of remission. Wahlman [4] stated that cases who had just begun to exhibit symptoms reacted better than old cases. It has been our experience that cases treated within the first year of the onset of their psychoses showed the highest percentage of remissions or recoveries. More than 85 per cent of cases whose psychoses were of six months' duration or less showed a sufficiently good remission to permit their being discharged from the institution.

[3] Ladislaus v. Meduna: Psycho-Neurol. Wchnsch., 37: 317, July, 1935.
[4] Wahlmann: Psycho-Neurol. Wchnsch., 38: 78, Feb. 15, 1936.

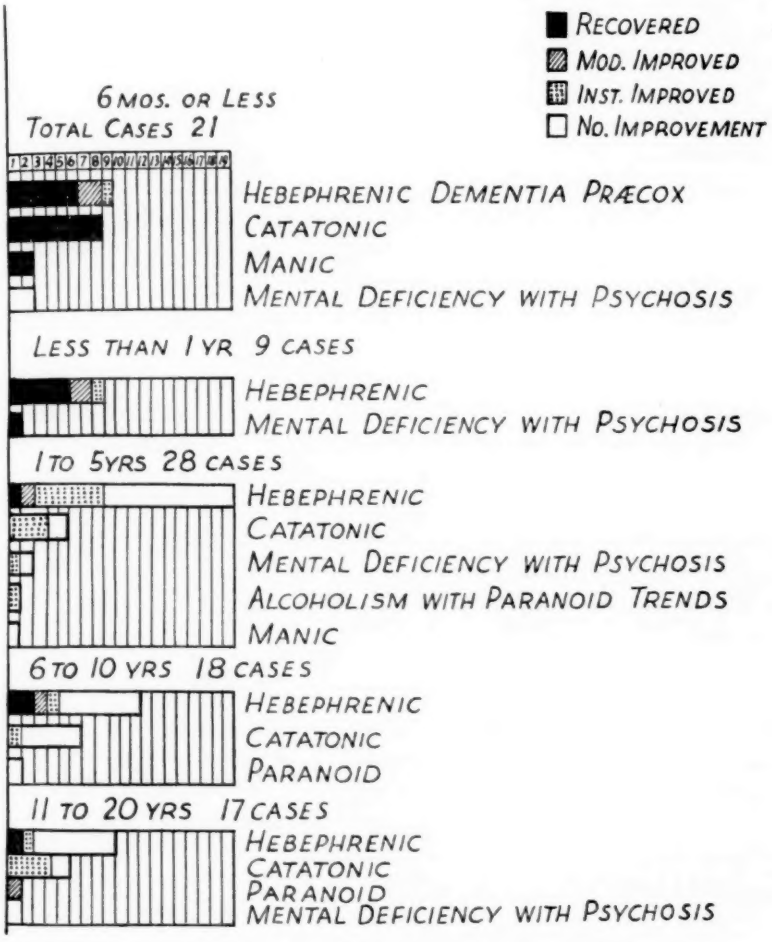
The percentage of recoveries shows a marked drop in those whose psychoses are of more than one year's duration. Ladislaus v. Meduna [3] stated that in cases older than one year the probability of recovery sinks rapidly until in cases of four years' duration



GRAPH 1.

remission can no longer be secured. We are not prepared to say that in cases of more than four years' duration remission can no longer occur. Graph 1 shows the percentage of remissions according to approximate duration of psychosis. The factor of age is important from the viewpoint of onset of psychoses. Since the

schizophrenic psychoses occur early in life and since the greatest percentage of remissions are in cases of less than one year's duration, it is obvious that patients in the earlier age groups would show



GRAPH 2.

a much higher percentage of remissions than cases in the later age groups.

As previously noted by Wahlmann,[4] patients who reacted more severely showed a greater degree of improvement. However,

although this applies in a general way, observations to date have not warranted any definite conclusion as to the severity of seizures or dose of metrazol in relation to recoveries. It has been interesting to note that patients showing a very pronounced fear of the treatment have had a very poor prognosis. No patient who was extremely fearful showed a tendency to recovery.

Graph 2 shows the results of therapy in all cases where the therapy was carried to completion, that is, to the point of complete recovery or to where it was felt that no further improvement would occur. It is noted that early cases, both catatonic and hebephrenic types, are likely to recover in a large percentage of cases. The number of other psychoses treated is not sufficient to warrant any definite conclusions with the exception that manic-depressive manic patients apparently recover with one to five treatments.

Relapses occurred in three of the patients treated, and in all cases the relapse was followed by a remission on the resumption of therapy. It is obviously difficult to evaluate the results of therapy because of the factor of spontaneous remissions; however, the percentage of psychoses of less than one year's duration showing recovery is far in excess of the percentage of remissions occurring spontaneously. Patients who recovered following therapy showed a better type of improvement than that seen in spontaneous remissions. There can be no doubt that recoveries do occur as a result of metrazol therapy and, that the treatment, when carried out with the proper technique, is safe. It is too early to speak of the permanency of recoveries. At the time of writing we have had many patients out of the institution for a period of over six months with no evidence of relapse.

BLOOD CHEMICAL CHANGES OCCURRING IN THE TREATMENT OF PSYCHOGENIC MENTAL DISORDERS BY METRAZOL CONVULSIONS.*

(A Preliminary Report.)

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and
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Therapy in the form of convulsions induced by intravenous injections of metrazol [5] has thus far been applied to 58 patients with psychogenic mental disorders at the Manteno State Hospital. Of these, 33 were diagnosed dementia præcox, three manic-depressive and four involutional melancholia. The results have been encouraging. Of the 33 dementia patients, six appeared to have recovered and six appeared to have improved; of the three manic-depressive patients, two appeared to have recovered; and of the four involutional melancholia patients, two appeared to have recovered. The treatment was most effective in the acute stages of these psychogenic mental disorders and in none of the patients was the mental condition aggravated. Further evaluation of the therapeutic aspects of convulsions induced by metrazol is being postponed until more patients have received what is considered to be a comprehensive series of metrazol convulsions.

We have selected for special study, as one phase of the investigation of the physiological changes in metrazol therapy, quantitative measurements of certain blood constituents before, during and at intervals after the artificially produced convulsion. A series of determinations of pH, lactic acid, glucose, carbon dioxide, phosphorus,

* From the O. S. A. Sprague Memorial Institute, The University of Chicago, and the Manteno State Hospital.

calcium and chloride was obtained for nine patients to whom the metrazol treatment was applied. The time required for maximum changes of blood constituents was established by drawing blood samples at varying intervals after the onset of the convulsions.

The reaction produced by the intravenous injection of metrazol varies in severity. One can recognize several degrees of responses, varying from cardio-respiratory stimulation or petit-mal like epileptic attack to severe reactions such as short clonic convulsion changing into a severe generalized tonic convulsion terminating in relaxation of the muscles and deep respirations of a few seconds' duration, which is followed immediately by clonic convulsions accompanied by deep rapid respirations occurring for a longer or shorter time, after which the patient regains consciousness. The type of reaction obtained varies with the dosage, the rate of administration and the individual's tolerance to metrazol.

Our method of obtaining blood samples for the several determinations was as follows: the blood was drawn just prior to the injection of the metrazol, at the height of the tonic convulsion, during the clonic convulsion and at intervals afterward. The blood was drawn from the cephalic vein into two syringes, one containing heparin as an anticoagulant. The heparinized blood was chilled and a portion immediately drawn into a glass electrode and the pH determined. The remaining heparinized blood was emptied under oil into a tube containing sodium fluoride to inhibit the enzyme action and thus to preserve its true glucose content. On this blood, carbon dioxide, glucose, chloride as NaCl, lactic acid were determined by the following methods respectively: Van Slyke and Neill;[7] Folin-Wu;[3] Whitehorn;[8] and Avery and Hastings.[1] The blood from the second syringe was permitted to coagulate in a 15 cc. centrifuge tube and the serum was immediately separated from the clot by centrifugation. The serum was analyzed for calcium and acid-soluble phosphorus by the methods of Roe and Kahn[6] and Fiske and Subbarow.[2] Inasmuch as the blood continues to circulate during the convulsions, we assume that the blood in the unobstructed cephalic vein undergoes changes of the same order as the venous blood throughout the body.

We shall present a graph of our findings in one representative case (C. F.) and a table of the results for each determination obtained in the other cases in our series.

pH.

The pH of normal individuals varies from 7.30 to 7.53. The range of variation in an individual during 24 hours is about 0.10 pH. According to Hopkins [4] the average pH of epileptics suffering

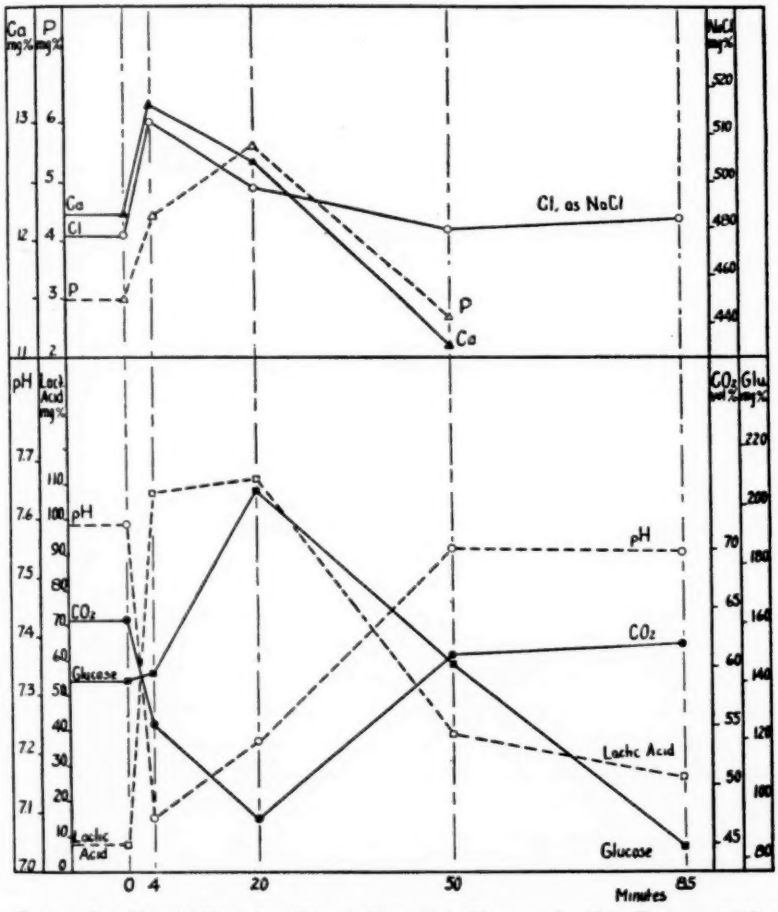


CHART I.—Graph Showing Blood Chemical Changes in One Representative Case (C. F.).

grand mal attacks is .07 to .1 higher than in the normals in eight different periods from 12 noon to 9 a. m. inclusive; it tends to be on the alkaline side of normal. The injection of metrazol does not change the pH of the blood when it fails to produce a convulsion.

During active tonic convulsion the pH is lowered. The maximum decrease in pH occurs from two to four minutes after the injection of metrazol. At this time, the patient is in a clonic convulsion, struggling and breathing deeply.

The pH returns to the pre-injection level sometime after 20 minutes. In some patients there is an over-compensation of the acidosis so that the blood becomes more alkaline. Vomiting may occur with the alkalosis.

LACTIC ACID.

The blood lactic acid values of normal individuals vary between the limits of 10 and 30 mgm. per cent. Prior to the metrazol convulsion the blood lactic acid values are within the range of normal values. During the tonic convulsion the blood lactic acid is rapidly increased, due to the diffusion from the muscle cells where it is being formed by anaerobic muscular contractions. In severe convulsions the maximum blood lactic acid value is found between 10 and 20 minutes after the injection of metrazol. Within 3 minutes after the injection the blood lactic acid reaches a value of 100 or more; it continues to rise and in one case reached a value of 160 in 16 minutes. After 15 to 20 minutes, its value decreases so that it is near a normal value in 45 to 60 minutes.

GLUCOSE.

In the absorptive state, blood glucose of normal individuals may reach values as high as 160, depending on the food consumed. The blood sugar of our patients just previous to the metrazol injection varies from 134 to 140 mgm. per cent. After the tonic convulsions are over and the clonic convulsion is well under way the conversion of lactic acid back to glucose proceeds rapidly and the blood glucose increases. When the clonic convulsion is over, the blood sugar may reach values above the kidney threshold. The maximum attained in our patients was 206 mgm. per cent.

CARBON DIOXIDE.

The CO_2 values are given in volume per cent in whole blood. During the tonic convulsion, these values decrease while muscular work is being carried on without oxygen. With the clonic convulsion the CO_2 continues to fall until it finally attains values in the range of 30 to 50 due to hyperventilation.

PHOSPHORUS.

The inorganic serum phosphorus of normal individuals varies from 3 to 5 mgm. per cent; the phosphorus varying inversely with the calcium. With the injection of metrazol this condition is altered; the serum inorganic P being increased over the pre-convulsion values up to 100 per cent. This increase is presumably due to the replacement of the phosphate of the muscle cell by lactate during the muscular contraction.

CALCIUM.

The inorganic calcium of the serum of normal individuals varies from 9.5 to 13 mgm. per cent. During the metrazol convulsion the serum calcium values stay within normal limits; slightly increasing during the acidosis and returning to their former level with the return of the pH to its original values.

CHLORIDE.

The blood chlorides of normal individuals vary from 450 to 550 mgm. per cent. During the metrazol convulsions, although the chlorides are increased, their values stay within the normal range of variation. During the early part of the convulsion the chlorides are elevated but soon return to normal when respiration is resumed.

DISCUSSION.

It will be noted from examination of the graph and table that some of the values obtained are as extreme as those found in agonal states.

It is seen that the pH of the blood may be forced through the full range compatible with life. This marked acidosis is presumably brought about by the production of lactic acid during muscular contractions. An attempt of the body to maintain its equilibrium is seen in the shift of the electrolytes from tissues into the blood.

These are some of the changes taking place in the body as evidenced by the blood during metrazol convulsions; there are others which remain to be investigated. Transient mental changes are sometimes seen before the blood changes return to normal. At other times mental changes are not perceptible until the next day.

TABLE I.

Pt.	Determination No.	Time at which determination was made	Determination of						
			pH.†	Lactic acid, Mg. %	Glucose, Mg. %	CO_2, Vol. %	Acid soluble P, Mg. %	Ca, Mg. %	Cl as NaCl, Mg. %
1 M. S.	1	•Control	7.52			56			446
	2	End of conv.	7.20			41			547
	3	After conv.	7.20			34			522
	4	Later	7.52						
2 A. S.	1	Control	7.53	6.5		68			480
	2	1 minute	7.26	81.2		59			509
	3	2 "	7.09	98.0		54			512
	4	17 "	7.36	78.3		43			481
3 G.	1	Control	7.59	8.0		64			429
	2	1 minute	7.33	57.7		62			486
	3	3 "	7.10						
	4	14 "	7.36	66.2		50			478
4 T. S.	1	Control	7.56	21.1					446
	2	40 seconds	7.24	58.5					501
	3	2 minutes	7.11	87.7					529
	4	3½ "	7.14	112.6					527
	5	6 "	7.17	111.9					475
	6	9 "	7.22	109.6					485
	7	72 "	7.62	39.0					449
5 C. F.	1	Control	7.59	7.9	140	64	3.0	12.2	477
	2	4 minutes	7.09	107.5	143	55	4.4	13.2	525
	3	20 "	7.22	111.5	205	47	5.6	12.7	497
	4	50 "	7.55	39.4	146	61	2.7	11.1	479
	5	85 "	7.55	27.4	84	62			484
6 T. M.	1	Control	7.58	19.3	134	102	2.9	12.1	491
	2	2½ minutes	7.20	111.5	151	86.7	4.5	13.9	512
	3	18 "	7.30	110.6	134	57.2	4.3	12.8	490
	4	60 "	7.58	36.5	100	91.2			491
7 W. K.	1	Control	7.63	14.8	148	72.1	2.9	12.4	466
	2	2½ minutes	7.03	147.7	162	83.4	5.0	13.5	527
	3	16 "	7.20	160.6	186	53.4	5.9	13.1	490
	4	45 "	7.47	76.2	186	67.2			469
8 M. S.	1	Control	7.56	17.3		59.4	3.2	10.4	438
	2	3 minutes	7.25	102.8		46.7	4.1	11.2	525
	3	15 "	7.39	80.0		47.5	3.3	12.2	494
	4	54 "		16.1		65.3	2.8	11.4	492
9 A. S.	1	Control	7.41	12.2		60.2	2.2	11.3	476
	2	2 minutes	7.11	112.8		40.4	3.4	12.5	524
	3	15 "	7.33	103.1		37.3	3.3	11.2	489
	4	50 "	7.55	28.9		69.	2.1	10.8	472

• The control determination was made immediately before the intravenous injection of metrazol.

† These values are slightly high (0.05-0.10 unit) due to the technical difficulties of handling samples in rapid succession.

The blood chemical changes noted provoke much speculation but until we have more information we cannot evaluate their rôle in the clinical course of patients with psychogenic mental disorders.

CONCLUSIONS.

Quantitative estimations of seven blood constituents were carried out on blood drawn from patients during various phases of metrazol convulsions. The findings indicate (1) a marked acidosis during and immediately after the tonic convulsion, the blood acidity being as high as is compatible with life; (2) a profound shift in some of the electrolytes; and (3) a recovery phase, varying in duration, in which the body recovers its chemical equilibrium.

The chemical changes are sufficiently uniform in all patients for one to predict what levels may be expected during any phase of the convulsion.

After an apparently complete recovery from a series of metrazol convulsions, we have observed in some patients suffering from dementia præcox, manic-depressive and involutional melancholia an apparent return to normal behavior. Our series is too small at present to draw conclusions as to the efficacy of metrazol therapy in each group.

We wish to thank Mr. H. T. Horton of Chicago for supplying the metrazol used in this series of experiments.

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RABIES VACCINE IN THE TREATMENT OF EPILEPSY.*

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Reports of the use of rabies vaccine in the treatment of various neurologic disorders for which there is no adequate treatment have sporadically appeared in the literature. Some investigators were attracted to its use because of its nervous tissue content and others because of the possible therapeutic effect of the attenuated or killed virus in neurologic disorders caused by a virus. Thus Liwschitz [1] treated dementia paralytica with rabies vaccine, and Barla-Szabó [2] reported considerable success in the treatment of poliomyelitis. Cruveilhier *et al.*[3] reported good results in various neurologic painful disorders. They treated patients with tabetic crises, migraine and sciatica, all of whom had gratifying results.

It would therefore have been extraordinary if rabies vaccine had not been taken up in the treatment of epilepsy. However, its planned use in epilepsy followed only after amazing reports appeared of the cessation of seizures in patients with epilepsy who had been bitten by dogs suspected of rabies and who had subsequently received antirabic vaccine. In 1914, Nikitin [4] reported the case of an epileptic who had been bitten by a dog suspected of having rabies and who became entirely free of seizures following the usual course of antirabic treatment. He had been free of seizures for 22 years when the report was made. This led Nikitin to try the antirabic treatment in several other patients in none of whom, however, he had as happy an outcome, although he was rather enthusiastic about the therapy and considered it superior to bromides. The best results of his planned treatment were in

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a man with a history of a chancre at the age of 15. A few weeks after the course of treatment the seizures disappeared for 8½ months. His citation of his other cases is not very convincing as he accepts freedom from seizures for short periods ranging from 11 to 39 days as indicating the superiority of this treatment to the use of bromides. Nicolić [5] reported the case of a man of 48 who had epileptic seizures since the age of 10. Until the age of 30 they occurred four to five times a year and then the frequency increased to two to three times a month. When he was 46 years of age the spells occurred daily or twice daily. He was bitten by a dog which was most probably healthy, but as a prophylactic measure antirabic vaccine was administered and the patient became free of seizures. None had recurred at the time the report was made (three months). Wright [6] reports the case of a man age 35 who had seizures since the age of 13. The seizures occurred about once a month until the age of 31 when they increased in frequency to one a week or every 10 days. He was given a course of antirabic vaccine and no seizures had occurred when the case was reported 1½ years later. Wright also relates the case of an epileptic, not treated by him, who was free of spells after the administration of antirabic vaccine. Shick and Hunsicker,[7] however, found negative results in 10 patients with epilepsy who were given a course of antirabic vaccine. Tyndel and Pasternak [8] also reported no changes in 10 patients with epilepsy who received a course of antirabic vaccine. Cruveilhier, Barbé and Nicolau [9] treated 17 epileptic patients with antirabic vaccine and reported a slight improvement in six, marked improvement in one and no results in 10.

Effect of Rabies Vaccine on the Seizures in 13 Patients with Epilepsy.

In view of the cases in which a successful outcome was reported it became important to investigate this form of therapy with the object of finding whether there is a type of epilepsy which responds to this treatment. We have completed the treatment in 13 patients. They each received a course of 21 doses administered daily and some have been given a second course. We used antirabic virus prepared by the Semple method.* The right and left abdominal

*The vaccine was furnished by the U. S. Standard Products Company, Woodworth, Wisconsin, to whom we acknowledge our appreciation.

and the subscapular regions were chosen for subcutaneous injections. The site of injection was alternated on successive days. As the following case reports indicate, none of the patients became completely free of seizures for long periods of time. Although the attacks ceased for two months in one patient (Case 4), it may be a coincidental remission. There was no change in the frequency or severity of the seizures in the remaining patients as a result of rabies therapy. All of our patients have been observed for at least six months following treatment.

Case Reports.

Case 1.—E. M. F. Single white woman, age 31. She had her first epileptic seizure at 14 and they thereafter occurred once a month during the menses. Later they became more frequent but treatment with luminal again reduced the frequency to about one a month. There were no neurologic findings on examination. There was no mental deterioration. Luminal was discontinued March 15, 1937, and antirabic treatment was begun. She had from one to four seizures almost every day during and after the treatment. On April 26, another course of seven injections was begun but the seizures continued until May 12, when luminal therapy was resumed. There was no change in the frequency or severity of the seizures.

Case 2.—I. M. A. Single, white girl, age 30. Epileptic seizures began at 16 following an appendectomy and occurred about once a month. Luminal was effective for a short time only when seizures recurred with the same frequency. There was no mental deterioration and no clinical findings of an organic lesion in the central nervous system. When she was treated with luminal she continued to have two to four seizures per month. Luminal was discontinued March 15, 1937, and antirabic vaccine treatment was begun. She had six convulsions during the following three weeks and seven the following month. A second course was begun June 5. After the second course she still had the same frequency of seizures.

Case 3.—A. M. Married white woman, age 26. Epileptic seizures began at the age of 17, occurring once weekly. For the past 2 years they have become more frequently and more severe. In February, 1937, she became restless, screamed, complained of "machinery in her head" and said that she would be killed. She was admitted to the Elgin State Hospital, February 26, 1937. Mental examination revealed considerable deterioration. She continued to have about six seizures per month while being treated with luminal. Luminal was discontinued April 8, 1937; she had five seizures the following week. Antirabic vaccine treatment was begun April 13, 1937; she had 13 seizures during the subsequent three weeks. There were nine seizures the following four weeks and the patient was placed on a second course of treatment during which she had seven seizures. There had been no change in the frequency of seizures following treatment.

CASE 4.—A. B. Single white woman, age 36. Epileptic seizures began at 13, three months prior to the onset of the menses. At first they were associated with the menstrual periods but soon became more frequent. She was at two state hospitals before her admission to the Elgin State Hospital. She was mentally deteriorated. Luminal was effective in causing the cessation of seizures. Luminal was discontinued March 15, 1937, and antirabic treatment was begun. She had eight seizures the following 12 days. She was then free of seizures until they occurred on June 1, 2 and 7. Her record now shows the same frequency of seizures as before treatment.

CASE 5.—W. G. Single white man, age 27. Epileptic seizures began at 14, occurring once a week. Petit mal attacks began at the same time and occurred twice daily. The seizures gradually became more frequent. On luminal treatment the frequency was lessened. However, he developed clouded states after each seizure lasting about 15 minutes. He became very irritable and engaged in frequent altercations with his father. Commitment to the Elgin State Hospital was necessitated by his clouded states. While taking luminal he had about three seizures per month. Luminal was discontinued April 7, 1937, and antirabic vaccine was begun April 13. He had ten grand mal and five petit mal attacks during the course of treatment, and 12 grand mal and five petit mal attacks during the following month. A second course of antirabic vaccine was begun June 1, 1937; he had five spells during the course of treatment and continued to have the same frequency of seizures after treatment.

CASE 6.—A. S. Married white woman, age 33. Epileptic seizures began at the age of 23, occurring daily, sometimes as many as 70 per month despite luminal treatment. She was admitted to the Elgin State Hospital in December, 1935, because she developed a "wild frenzy," fought with every one near her, shouted and threatened to kill herself. At Elgin she exhibited similar behavior and her seizures were not completely controlled with sodium bromide 60 grains, and luminal 1½ grains daily. Mental examination revealed considerable deterioration. Medication was discontinued June 3, 1937, and antirabic vaccine administration was begun June 7, 1937. She had 24 seizures in three weeks. She continued to have the previous frequency of seizures after treatment.

CASE 7.—E. W. B. Married white woman, age 40. Epileptic seizures began at 25, shortly after her marriage. She was admitted to the Elgin State Hospital because she became violent, fought with those about her and threatened suicide. Examination revealed mental deterioration. At Elgin she had daily seizures despite luminal treatment. Luminal was discontinued June 9, 1937, and antirabic vaccine was begun June 10, 1937. She had 33 seizures the following two weeks and then continued to have her previous frequency of seizures.

CASE 8.—A. B. L. Single white woman, age 32. Epileptic seizures began at 13, occurring once a month during the menstrual periods. They soon

became more frequent until at times there were as many as three or four a day. She became noisy, irritable and excited and on four occasions was sent to the Psychopathic Hospital. She was admitted to Elgin State Hospital in November, 1934, because she was in a clouded state after a series of 17 consecutive convulsions. Under bromide medication the frequency of the seizures was reduced to about 6 per month. She improved and was paroled in July, 1935. She returned to Elgin in March, 1936, because she had another clouded state. When treated with luminal her spells were reduced to six per month. Luminal was discontinued June 3, 1937, and she had 11 seizures in four days. Antirabic vaccine was begun June 7, 1937, and she had 12 seizures in three weeks. She continued to have the same frequency of seizures after treatment.

CASE 9.—M. D. Single white woman, age 19. Convulsive seizures began when she was 11 months of age. At the age of 2½ she had a series of convulsions lasting five hours, following which she developed a paralysis of her right side. After the age of 11 the seizures became more frequent, occurring five to six times per week. She became stubborn, moody and over-religious. She threatened to kill the members of her family and herself. She was admitted to Elgin State Hospital April 30, 1937. While receiving luminal she had four spells per month. Luminal was discontinued June 9, 1937, and antirabic vaccine was begun the following day. She had six seizures during the first week and then the previous frequency of seizures was resumed.

CASE 10.—C. B. S. White male, age 17. (Patient of Dr. T. T. Stone.) Epileptic seizures began at nine in the form of petit mal four to five times a day. In the past two years the frequency of the seizures ranged from one to two per month to one in five days. Neurological examination was negative. A psychometric test indicated an intelligence quotient of 105. He had been on bromide and luminal medication without benefit. Antirabic treatment was begun June 2. He had four grand mal seizures during the course of treatment despite the fact that he was also receiving bromide medication. The same frequency of seizures continued after treatment.

CASE 11.—P. D. White man, age 30. Epileptic seizures began at 25 years of age. He was a chronic alcoholic and had been at one time committed to a state institution. His seizures ranged in frequency from one to four a week to two per month. They consisted of major and minor seizures and epileptic equivalents. His seizures were decreased in frequency with luminal. Rabies vaccine treatment was begun May 8, 1937. He had four seizures during the course of treatment (three weeks) and one seizure several days after the completion of the course. Luminal treatment was resumed.

CASE 12.—F. F. Single white woman, age 19. Epileptic seizures began at 17 and she had a seizure every four to six weeks. During the last year she had three seizures a week. The only neurologic finding was a slightly wider palpebral fissure on the right side. Rabies vaccine treatment was begun May 23, 1937. She had two seizures on June 7, 1937. She now has the same frequency of seizures as before treatment.

CASE 13.—C. B. Woman of 51. Epileptic seizures began at 36 years of age. They occurred from two to three times a day to two to three times a month. They were major, minor and equivalents. She was admitted to Cook County Hospital April 8, 1937, in a stuporous state after having been in status epilepticus for four days. Rabies vaccine treatment was begun May 1, 1937. She had four seizures during treatment. She was admitted to the Northwestern University Medical Clinics June 4, 1937. On June 11, 1937, she went into a status and had 14 seizures. She was re-admitted to Cook County Hospital June 13, in a stuporous condition and expired the following morning.

SUMMARY.

In view of the reports of the cessation of seizures in patients with epilepsy following a course of treatment with antirabic vaccine, we administered this form of therapy to 13 patients with epilepsy. There was no critical change in the frequency or severity of the seizures as a result of rabies vaccine therapy.

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THE USE OF INTRAVENOUS METHYLENE BLUE IN STATUS CONVULSIVUS.*

By LASLO KAJDI, M. D., and CHARLES V. TAYLOR, M. D.

Ehrlich showed in 1890 that methylene blue, injected in the living animal, stained not only the axons of peripheral nerves, but also some muscle fibres of the arteries. On the basis of the theory that migraine attacks were caused by vascular spasm he decided to try to abort them by injecting methylene blue at their beginning, and was successful in two cases. Many writers have reported favorably on the intravenous use of methylene blue in cyanide poisoning cases and some have even reported success in carbon monoxide poisoning cases, suggesting to us that it may be used to relieve conditions involving interference with tissue respiration. As local vascular spasm and local relative anoxia in the central nervous system have been demonstrated in both induced and spontaneous convulsions, one of us conceived the idea that this substance might be useful in relieving status convulsivus. We cannot prove that methylene blue injected intravenously acts as an auxiliary respiratory catalyst, we merely report our experience with its use in severe status.

Only those cases in which the patient was completely unconscious (*i. e.*, non-reactive to painful stimuli, with absence of deep reflexes) between attacks were accepted as being status. The treatment was considered entirely successful only when it promptly restored consciousness and terminated the series of convulsions. In contrast to the effect produced by the customary sedative treatments which usually result in longer or shorter periods of continued unconsciousness or sleep and are often followed by severe headache, methylene blue restored consciousness very promptly without these unpleasant after-effects.

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

From The Harriet Lane Home of the Johns Hopkins Hospital and the Department of Pediatrics of the Johns Hopkins University School of Medicine; and the Clark Epileptic Colony of the Springfield State Hospital.

This treatment was used on 22 occasions in 20 patients, 4 children and 16 adults of various ages and types, as detailed in the appended tabulated case reports.

Entirely satisfactory results were obtained on 11 occasions in 10 patients. Five patients had evidence of localized organic etiology, one had a history of lead poisoning, one of measles encephalitis, and three were of unknown origin.

In this group of entirely successful cases attacks ceased within 5 to 90 minutes after the injection of 2 to 20 cc. of 1 per cent methylene blue. In these cases continuous unconsciousness had existed from 2 to 48 hours, and in one case only one-half hour, before the methylene blue was injected. The number of attacks before injection ranged from 8 to more than 100. Five received no previous emergency treatment, and six were treated similarly to F. K. In nine cases consciousness was completely restored within 10 to 30 minutes, and in the other two cases within one and one half hours. None of these patients complained of headache; one reported a "hot" sensation in the back and neck, five of them were able to get up and resume their usual activities within one and one-half to two hours.

In one additional case the result was questionably successful; the drug restored the patient to consciousness after 10 minutes, but he became excited, combative, expressed paranoid complaints and needed to be restrained.

On 10 occasions in nine patients the drug failed. In one patient consciousness was restored and voluntary motion reappeared on the side which sustained a flaccid paralysis of 34 hours before, but convulsions recurred after two hours. In an arteriosclerotic patient, anticonvulsive action began in 10 minutes and was complete in two and a half hours, but consciousness was not restored until after six and one half hours. On three occasions in two patients it temporarily controlled attacks, but consciousness was never completely restored. In five patients it had no observable effect; three of them died. In most of these unsuccessful cases the ordinary measures for control of status were subsequently used.

Ordinary control cases are not available, but comparative mortality figures are suggestive. In the same institutional group with a population of more than 300 adult chronic epileptics there were 25 status deaths in the five and one-half years immediately preced-

Name; sex; age.	Case description.	The status.	1 per cent methylene blue.	Results.
Edward C. M.; 35.	Head injury at 17 months caused convulsio s for 8 hours followed by right hemiplegia, which gradually cleared up with only residue, a tremor and past pointing. Development normal until five years, when periodic convulsions began. Usual frequency 150 grand mal attacks per month.	Began on 3-17-36; after six hours complete coma occurred in spite of two 5 grain doses of sodium luminal hypodermically. Gradually developed bilateral pulmonary edema.	6 cc. @ 1 cc. per minute, 9 hours after onset, 3 hours. after coma.	No further attacks. After 30 minutes could make appropriate responses to requests; could not talk due to pulmonary edema which lasted 72 hours.
Eleanor C. F.; 21.	Background of feebleminded alcoholic parents and four years of sexual relations with foster brother. Developed anxiety attacks after onset of irregular menses and pregnancy accusations at 12. Repeated sex traumata and continuous social condemnation led to development of automatic convulsive habit at 17. No intellectual deterioration. Usually has two petit mal per month.	Began on 8-24-35; continued having 12 attacks per hour in spite of receiving 5 grains of sodium luminal ¾ hour after onset. Became completely comatose after 110 minutes, and frequency increased 30 per hour.	20 cc. @ 2 cc. per minute, 2 hours after onset, 10 minutes after coma.	Only two attacks in the first four minutes of injection; fully conscious after one more minute.
Mazie H. F.; 66.	A congenital mental defective who developed convulsions after onset of cerebral arteriosclerosis at 60 years. Usually has only four attacks per year.	Began on 11-20-35; continued having 5 attacks per hour in spite of receiving 5 grains of sodium luminal ¾ hour after onset. Became comatose after 115 minutes.	8 cc. @ 2 cc. per minute, 2 hours after onset, 5 minutes after coma.	Became fully conscious after six minutes. Had one attack 30 minutes later.
Frank K. M.; 39.	Difficult forceps delivery. Convulsions began during typhoid fever at three years. Hospitalized at 14 years because of severe behavior problem. Averages eight grand mal attacks per month and has gradually deteriorated.	Began on 7-4-35; continued having one attack every 45 minutes in spite of receiving 25 grains of sodium luminal hypodermically, 45 grs. of sodium bromide and 45 grains of chloral hydrate by mouth In the first 58 hours. Became comatose.	10 cc. @ 2 cc. per minute, 72 hours after onset, 14 hours after coma.	Became fully conscious after ten minutes. No convulsions. Able to go to congregate dining room after 1½ hours.
Alexander K. M.; 20.	Difficult delivery. Defective sister. At 12 years he had a cerebral accident after a second abdominal operation in one week, resulting in aphasia, right sided convulsions, and cessation of school progress. Has Jacksonian attacks in groups of 10 at irregular intervals. Now deteriorated.	Began on 11-24-35; continued having 30 attacks per hour in spite of 10 grains of sodium luminal hypodermically in the first 1½ hours. Became comatose in the third hour.	8 cc. @ 1 cc. per minute, 34 hours after onset, 1½ hours after coma.	Convulsions ceased after 6 minutes. Became fully conscious after 20 minutes. Resumed usual activities after two hours.
Rose McG. F.; 23.	Alcoholic defective father. Tuberculous mother. Developed colloid goitre at three years. Severe measles at 12 years was complicated by a series of convulsions, and grave optic atrophy. After three months began having daily petit mal. Usually has 120 attacks, mostly petit mal, per month.	Began on 11-9-36 as a result of attempted suicide by avoiding phenobarbital; had 12 attacks per hour involving only face and head; developed coma after 4½ hours.	8 cc. @ 2 cc. per minute, 5 hours after onset, ½ hour after coma.	No convulsions. Conscious after three minutes. Had a rectal temperature from 101 to 103 for 18 hours.

Name; sex; age.	Case description.	The status.	1 per cent methylene blue.	Results.
Charles W. M.; 24.	Defective paternal sibling. Head injury without complications at 14 months. Treated for congenital syphilis since age of 3 years. Right Jacksonian attacks appeared at 4, and were relieved for 18 months by brain operation. Made poor school progress. Usually has 3 grand mal attacks per month.	Began on 6-18-36 as a continuous coma with bradycardia after two short attacks of projectile vomiting. After four hours developed extensor rigidity.	5 cc. @ 1 cc. per minute, 15 hours after onset.	Extensor spasm relaxed after 5 minutes. After 5 more minutes became fully conscious. Bradycardia persisted 24 hours.
Carl W. M.; 6.	Subject to asthmatic bronchitis until 4 years of age. Minor attacks, with involuntary voiding, occurred several times daily for the previous 6 months. Air injection gave negative result. The various sedatives proved ineffective. After his status epilepticus he was placed on ketogenic diet and became free of attacks (3 years of observation). Mental development normal.	Began on 3-1-34; minor attacks frequent, remained stuporous between attacks, did not speak, eat or make spontaneous movements for two days. His usual medication was given. In the one half hour preceeding injection 12 attacks were observed.	2 cc. @ 1 cc. per minute, 54 hours after onset.	Within next 30 minutes, 6 attacks were observed, but consciousness returned, he became talkative, played with jig-saw puzzle. In the following hour had 2 short petit mal seizures, was completely conscious immediately after these attacks.
Clarence B. M.; 7.	Normal infancy, except a little late in walking. (17 months.) Onset of convulsions at age of three, occurring biweekly, then more frequently and grouped. Deteriorated mentally—a complete idiot at 5 years.	Began on 3-3-34, convulsions 5-10 minutes intervals. In 24 hours was comatose, could not be aroused; was unable to swallow.	4 cc. given 1 cc. per minute, 54 hours after onset, 30 hours after coma.	No further attacks for one week. In 10 minutes was able to sit. 15 minutes after injection peeled and ate a banana offered to him.
Morris F. M.; 55.	Russian born. Normal until onset of petit mal habit following danger of losing life in a factory fire at the age of 16. At 32 had grand mal attacks followed by 2-3 days' blindness. With onset of hypertension and arteriosclerosis at 50, attacks became left Jacksonian. Usually has six attacks per month.	(1) Began 5-21-36; had 40 grand mal attacks in one hour in spite of receiving 5 grains of sodium luminal after the third attack. Developed pulmonary edema after 30 minutes, and coma 14 minutes later.	(1) 2 cc. @ ½ cc. per minute, 1 hour after onset, ½ hour after coma.	(1) Increasing length of interval phase for 30 minutes, when attacks ceased. Talked intelligibly 30 minutes later. Edema persisted 48 hours.
		(2) Began 12-27-36; had continuous Jacksonian circuit of left leg, to arm, to face. Became comatose after one hour.	(2) 9 cc. @ 2 cc. per minute, 1½ hours after onset, ½ hour after coma.	(2) In 20 minutes time all clonic contractions became synchronous and a definite interval occurred. Convulsions stopped entirely and he became fully conscious 65 minutes later. A spastic paralysis of right arm and leg persisted 10 days.
Josephine B. F.; 28.	Normal development. Onset of petit mal at 5, with subsequent flaccid right hemiplegia and cessation of mental development. On onset of menses at 13, attacks became grand mal and patient has since become a progressive behavior problem. By the age of 16 hemiplegia had disappeared. Averages 4 grand mal per month.	Began 10-29-34; had 30 right Jacksonian attacks per hour and developed flaccid right hemiplegia after 2 hours. Received 5 grains of sodium luminal hypodermically, and another such dose combined with spinal drainage in the first 24 hours. Comatose after 35 hours.	25 cc. @ 1 cc. per minute, 36 hours after onset, 1 hour after coma.	Consciousness and voluntary motion on the right returned after ten minutes. No convulsions for two hours. For the next three days had 2-4 grand mal attacks daily.

	become a progressive behavior problem. By the age of 16 hemiplegia had disappeared. Averages 4 grand mal per month.	of sodium luminal hypodermically, and another such dose combined with spinal drainage in the first 24 hours. Comatose after 35 hours.	coma.	had 2-4 grand mal attacks daily.

Name; sex; age.	Case description.	The status.	1 per cent methylene blue.	Results.
William B. M.; 35.	Adequate history unobtainable. Hospitalized since onset of grand mal attacks followed by paranoid confusions at the age of 6; always a stammerer, never teachable. Usually has 12 attacks per month.	Began 11-5-36 as a continuous series of general clonic convulsions for 20 minutes followed by continuous coma. No result from 5 grains of sodium luminal given hypodermically 10 minutes after onset.	4 cc. @ 1 cc. per minute, 80 hours after onset.	Conscious after 10 minutes. Progressively excited thereafter, requiring chemical and physical restraint for 8 hours.
Robert M. M.; 63.	Ancestry feebleminded and subject to cardiovascular disease. Meningitis at 4 was complicated by convulsions and cessation of mental development. A gradual deterioration since 30. Marked arteriosclerosis since 51. Usually has 6 grand mal attacks per month.	Began 6-28-36 as a practically continuous series of clonic convulsions. Became completely comatose in 1¼ hours.	10 cc. @ 2 cc. per minute, 1½ hours after onset, ½ hour after coma.	After ten minutes definite intervals appeared; after 2½ hours convulsions stopped; after 6½ hours consciousness returned. A flaccid left hemiplegia persisted 2 weeks.
Catherine O. F.; 22.	Tuberculous paternal and psychopathic maternal ancestry. Convulsions began at 9, 6 months after minor auto accident. Menses began at 10. Rapid weight gain 12-14, rapid loss 14-16. No menses 15-17. Usually has 12 grand mal attacks per month.	(1) Began 5-7-35 with early coma and 10 grand mal attacks per hour. Treated with morphine at home for 2 days. Had cerebral edema, coma and exhaustion on arrival at hospital 5-9-35. Attacks continued 2 per hour for 6½ hours in spite of 5 grains of sodium luminal hypodermically.	(1) 10 cc. @ 1 cc. per minute, 5¼ hours after onset, 6¼ hours after sodium luminal.	(1) For 2 hours had no attacks; recurred 1 per hour for the following 8 hours. Semistuporous for the next 5 days.
		(2) Began 1-26-36 at home. Had 10 per hour for 5 days and was returned in a state of starvation acidosis and coma. Had received 10 grains of sodium luminal daily at home.	(2) 10 cc. @ 1 cc. per minute, 5 days after onset.	(2) Convulsions ceased for 10 hours. Remained stuporous for 7 days. Had a flaccid right hemiplegia that persisted 8 weeks, during which there was excessive rapid weight gain.
Lester R. M.; 34.	Alcoholic father. Development normal. Onset of convulsions at 2. Under treatment after 7 with good school progress. Developed alcoholism with depressive reaction at 27. Hospitalized at 28 in alcoholic coma. Usually has 12 grand mal attacks per month.	Returned from parole on 6-22-36 in alcoholic stupor with 2 convulsions per hour. Only 1 per hour after 5 grains of sodium luminal, but became comatose after 11 hours.	5 cc. @ 1 cc. per minute, 26 hours after onset, 1¼ hours after coma.	None. Given 5 grains sodium luminal 5 and 15 hours later, but developed pulmonary edema.
			10 cc., 15 hours later.	Dyspnoea relieved; stopped convulsions for 4 hours. Developed aspiration pneumonia.
			10 cc., 11 hours later.	Free from convulsions and fully conscious for 6 hours. Remained febrile for 4 days longer.

Name; sex; age.	Case description.	The status.	1 per cent methylene blue.	Results.
Flavia E. F.; 37.	Onset of convulsions at 31 after 6 years' quarrels with husband. Rapid deterioration of habits and judgement. In hospital had 2 attacks per year. Rapid vegetative decline over a four month period led to encephalography.	Continuous stupor began on 8-29-35 two hours after encephalography. After 6 days of tube feeding and intravenous glucose began having high fever and a series of convulsions at the rate of 16 per hour.	10 cc. @ 1 cc. per minute, ½ hour after onset of convulsions.	For about 19 minutes seemed less comatose. No convulsions for 10 hours. On recurrence convulsions continued until death two days later.
Henry K. M.; 42.	Insane paternal uncle; epileptic mother. Began having dizzy spells at 13. No deterioration until after first grand mal attacks at 20. Usually has six grand mal attacks per month.	Began 9-30-36 having 12 grand mal attacks per hour. Attacks continued in spite of 10 grains of sodium luminal hypodermically in the first 4 hours; comatose in the 10th hour.	10 cc. @ 1 cc. per minute, 12 hours after onset.	None. Attacks gradually decreased from exhaustion in spite of intravenous glucose. Died 12 hours later. No gross pathologic changes.
John T. M.; 38.	Dysplastic congenital imbecile who developed grand mal at 23 and was hospitalized 4 years later because of economic problem. Averaged 10 attacks per month until last year when he had only 4 per month after halving his phenobarbital dosage.	Began 12-28-36; attacks averaged 6 per hour in spite of 5 grains of sodium luminal ½ hour after onset. Gradually became comatose.	5 cc. @ 1 cc. per minute, 5½ hours after onset, ½ hour after coma.	After ½ hour, no attacks for 5 hours, but high fever and excitement developed. Attacks recurred with frequency of 30 per hour.
			10 cc., 1½ hours after recurrence.	General clonic convulsions changed to those of left facial muscles only. Fever and coma continued. After 4½ hours convulsions stopped from exhaustion which developed in spite of hypodermic and intravenous fluids. After 11 more hours death occurred.
Elizabeth R. F.; 14.	Had febrile convulsion at one year. Attacks began at 5½ years as several petit mals daily; later had also monthly grand mals. Sedatives and ketogenic diet did not control attacks satisfactorily.	Began 3-15-34, the day preceding her first menstruation. Frequent minor seizures, never regained consciousness.	5 cc. @ 1 cc. per minute 4 hours after onset.	No more attacks. One hour later was able to answer simple questions, but was very dull. In another hour could walk up and down steps, to lace and unlace her shoes. Remained very dull.
Earl C. W. M.; 17.	Attacks began at 9 years as grand mals at 2 week intervals. Luminal medication controlled attacks for 10 months, then family discontinued medication.	Began on 10-1-36. Complained of headache, and lay down. Became disoriented before any attack was noticed. Then grand mal attacks occurred at 10-15 minute intervals. Was stuporous, then unconscious between attacks.	10 cc. @ 1 cc. per minute 20 hours after the onset.	No apparent effect. 3 grains of luminal subcutaneously had no effect. Became dehydrated. Temperature rose to 101 C, hemoglobin 130 per cent. Paraldehyde, and repeated doses of luminal, subcutaneous saline were given for three days. Only on the fourth day was he able to answer questions.

ing the use of methylene blue therapy. There were only three status deaths in the two and one half year period during which it has been used. This was a gross reduction to less than one third of the previous mortality rate.

Conclusion.—Several years' experience with the intravenous injection of 1 per cent methylene blue solution in 22 instances of comatose status convulsivus resulted in: (1) rapid restoration of consciousness in 13 (59 per cent); (2) rapid, complete control of convulsions in 13 (59 per cent); and (3) a 66 per cent reduction in status mortality in a chronic epileptic group. The clinical results justify a more general use of this method in such conditions, and the effect on disturbed consciousness, a factor common to all types of seizure phenomena, indicates the need for investigation of its mode of action.

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DISCUSSION.

DR. STANLEY COBB (New York, N. Y.).—I have a special interest because of my recent work using vital red. In using methylene blue we have more reason to believe we have a mechanism that we can explain, perhaps by adding oxygen. It is hard to decide in these extremely severe cases of status epilepticus if you really have helped or not. Although the speaker has interesting and worth while evidence, we ought to have more before we can evaluate it and be convinced.

DR. THEODORA WHEELER (Chicago, Ill.).—Permeability is an easy thing to say but little is known about it. Some of my friends who use bromide a

great deal say that they are sure the bromide doesn't get to the inside of the cell, that it is stopped on the exterior. I don't know of any way of testing these two agents. It is something to think about, and if evidence comes one way or the other, to hold in mind.

DR. HUGO MELLA (St. Cloud, Minn.).—I would like to know what procedure was followed before that percentage was reached, whether there are some precautionary measures to be taken. Why wasn't it 3 per cent or 2 per cent? Is there a sterilization used to avoid changing the percentage?

DR. LASLO KAJDI (Baltimore, Md.).—With regard to Dr. Cobb's remarks, I agree that it is difficult to say after using the drug that either the drug was effective or that convulsions would have stopped anyway, but if anybody has seen cases described as successful, it would be hard to escape the impression that it did good for the patient. The reason we gave this paper is to call attention to the fact that when other measures fail, this is something that may be tried. One especially successful case described was interesting as the child wasn't able to talk and hadn't taken any food, though he was able to swallow. The mother gave the usual medication to the child before the attack and the child had to be supported from the taxicab when he came to the hospital and was put on the examining table. After the injection was given I watched the child for a little while. Then I gave instructions to the mother because I had to attend another patient. When I went back after the first half hour, the mother reported that the child talked to her many times and even started to remind her that the doctor told her to mind him, and he was aware that he had a spell. He talked to me after the half hour was over. To test how much the child was interested in his environment, I gave him a jig saw puzzle, which naturally was simple, and he took it with great pleasure as he would have on his better days and played with it.

That was the reason we tried it on other patients. I would like to make it more complete by saying we tried on the same patient the methylene blue as a preventive of further attacks without success.

With regard to other remarks, we emphasized in the paper that we don't try to give at the present time any explanation of the manner in which the drug acts. As we said in the introduction, it was given so you would have some idea why we happened to use the drug. I was much interested when I heard this spring of Dr. Cobb's interesting and somewhat similar experiments with vital red.

The reason we used the 1 per cent solution is because it is in sterilized ampouls in 50 and 100 cc. doses and readily available. The reason we used such a small dose was we felt that the dye shows an affinity to the central nervous system, and we thought if it didn't help, we could repeat the dose. In the majority of the cases which were a success, there was no reason to repeat the injection, but in the cases of failure, the methylene blue was used in repeated doses and it usually failed. So in adults I wouldn't give more than 20 cc., if 10 cc. repeated at one-hour intervals do not help the patient.

STATISTICAL CONTRIBUTIONS FROM THE MENTAL HYGIENE STUDY OF THE EASTERN HEALTH DISTRICT OF BALTIMORE.

II. PSYCHOSIS IN THE EASTERN HEALTH DISTRICT.

1. The Incidence and Prevalence of Psychosis in the Eastern Health District in 1933.

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A. General Account of the Psychotics.

In the Introduction to these Reports of the Eastern Health District Mental Hygiene Study's 1933 Survey,[1] it was stated that the survey discovered for that year 335 active cases of psychosis who could be allocated to the district. In this paper these cases will be studied with a view to estimating the incidence and prevalence of psychosis in the district.

The primary subdivision of the psychotics that has been found to be most useful for statistical treatment is their grouping by certain general facts of hospitalization. This subdivision is shown in Table 1.

TABLE 1.

Eastern Health District Individuals with Psychoses in 1933, Grouped by Certain Facts Concerning Hospitalization.

Hospitalized in 1933 for the first time—Total		71
Admitted prior to 1933—Total		202
Still in hospital in 1933	182	
Discharged prior to 1933	20	
Not hospitalized prior to 1934—Total		62
Hospitalization not known to have been advised	48	
Hospitalization advised but not carried out	14	
Total		335

[1] Cohen, B. M., and Fairbank, R. E.: Statistical contributions, etc. I. General account of the 1933 survey of the Eastern Health District. Am. J. Psychiat., 94: 1153, March 1938.

In gathering the data which yielded these cases, the main consideration, other than that of diagnosis, has been the establishment of residence as in the Eastern Health District some time during the calendar year 1933. No difficulty was encountered here, except that some of the individuals hospitalized prior to 1933 who were in hospital during all of 1933 could not be identified with a 1933 census household,[2] nor could their 1933 Eastern Health District address be verified in any other way.

These individuals, of whom there were 68, constitute a particularly difficult problem in determining the prevalence of psychosis for this limited area. Their only source of information was the hospital records and in these records the only address given was an Eastern Health District one. However, all of them had been continuously in hospital since some time before January 1, 1933, and many had been in for quite long periods, in some cases over 20 years.

The general procedure of the study is to consider as a 1933 resident of the district, not only any person identified in the 1933 census or found by social or other agencies living at an Eastern Health District address in 1933, but also any individual of unknown address whose immediate family lived in the district in 1933, or whose regular place of residence as a lodger could be shown to be that of a 1933 district household. In accordance with this, any patient in a hospital, whether the hospital is in the district or not, is a resident of the district if he fulfils any of the above conditions. In the case of these 68 hospitalized psychotics there was found no information of any kind about the family, so that, according to the definition, they may or may not have belonged to the district population of 1933.

Three of these 68 patients were known to have lived entirely alone, at a district address, up to the time of their hospitalization. Ten (including one of the three who had lived alone) died during the years 1934, 1935 and 1936, and death certificates of eight of these were found in the state or city health departments. The certificates of five gave an Eastern Health District address as the regular residence, of two an address not in the district, and of one merely "Baltimore City." These facts are given to show the results of

[2] *Ibid.* p. 1156, footnote 4.

what further tracing could accomplish. They tell nothing that may be applied to the year 1933, except by inference.

The indication from these considerations was clearly that the decision about their inclusion in or exclusion from the whole group had to be made, not from ascertainable facts but from general, more or less *a priori,* considerations. It was decided to include them for two reasons: (1) So far as regards their being psychotic and patients in hospitals for mental disease is concerned, the most recent information up to January 1, 1934, gives them an Eastern Health District address only, and there is little possibility that they may be included also in any other survey for some other area. (2) Although it is likely that the group includes some individuals who would be excluded if further information were available, these may be taken to compensate, to some extent, for the cases, of unknown number, whom the study missed.

Returning to Table 1, it will be observed that subdivision of the group by the facts of hospitalization considered there provides also something of a "natural" classification in terms of relative severity and relative duration of illness. The 273 hospitalized patients represent the more severe cases as compared with the 62 unhospitalized individuals, who may be considered the less severe cases. Among the latter, the further subdivision by whether hospitalization was recommended or not carries this idea to a somewhat finer degree, showing 48 individuals who were apparently not sufficiently ill to require hospitalization.

The group hospitalized prior to 1933, on the other hand, consists of those cases in which psychoses have tended to persist. The questions of duration of hospitalization, recoveries, discharges, readmissions, mortality and the like, all need to be considered in connection with this group, and these matters will be taken up in detail in a later paper. For the present there need be pointed out only the apparent discrepancy between the 71 first admissions during a single year and a total accumulated number of only 202 admissions of all prior years. The aim is to present only the active cases who were part of the Eastern Health District population some time in 1933, so that these 202 old admissions do not, of course, include patients who, prior to January 1, 1933, either died, recovered or moved [3] from the district.

[3] This refers to the family if the patient remained in hospital through 1933.

The questions of diagnosis and the system of classification underlying the data which are being presented in this paper are of importance. So far as diagnosis is concerned, the Mental Hygiene Study functions in a rather limited way. Information about cases comes to the study from a large number of sources and usually consists of a brief account of the individual's behavior and personality, together with a statement of the type of disorder. Occasionally, only the behavior and personality descriptions are obtainable, as in the case histories of social welfare agency clients who have not also psychiatric clinic reports. In such instances the individuals are classified as "undiagnosed," even though most of these have sufficiently full descriptions of symptoms to permit a definite diagnosis. In a few cases where a psychiatric examination was not given until after 1933, if the diagnosis is made on the basis of the same symptoms as those exhibited in 1933, this diagnosis is used. In some cases, where an individual has had several clinic contacts or periods of hospitalization or both, there are found conflicting diagnoses. As a rule, the most recent diagnosis of a clinic or hospital is accepted, although at times the symptoms in evidence in 1933 have indicated that an earlier diagnosis is to be preferred.

From the above, it is apparent that, for the purpose at hand, the classification of psychoses had to take a very broad form. The classification adopted by the Mental Hygiene Study, shown in Table 2, was set up largely from detailed examination of the information in the study's records. That is, it was developed empirically to fit the material, keeping in mind that the fewer the subdivisions, the less likelihood there would be of errors in the assignment of individuals to particular classes. It is believed that this probability of reduction in errors compensates for the lesser degree of explicitness for which this classification provides, and that it may be accepted as a rather broad, but still reasonably accurate, description of the psychotic group as a whole.

Table 2 gives the distribution, by type of psychosis, of all cases active in 1933 of each of the three groups of psychotics and the total psychotics. This table shows the comparative distribution, by type of psychosis, of (a) the less severe cases, in the unhospitalized group; (b) the more severe cases, in those who were hospitalized; and (c) the cases less likely to recover, in the old admissions that remain psychotic. Of the 21 cases of undiagnosed psychosis in the

unhospitalized group, at least 16 show symptoms indicating their type. Six appear to be depressions, two dementia præcox, two paranoia or paranoid condition, four senile or arteriosclerotic psychosis, one involutional melancholia and one traumatic psychosis. The remaining five show definite psychotic symptoms but their records lack full enough descriptions to allow a probable diagnosis.

TABLE 2.

NUMBER AND PER CENT OF CASES IN THE THREE PSYCHOTIC GROUPS AND IN THE TOTAL PSYCHOTICS, BY TYPE OF PSYCHOSIS.

	Unhospitalized.		First admissions—1933.		Admitted prior to 1933.		Total.	
Type of psychosis.	No.	%	No.	%	No.	%	No.	%
Manic-depressive psychosis	..	...	4	5.6	17	8.4	21	6.3
Depression	18	29.0	6	8.5	9	4.5	33	9.8
Involutional melancholia	1	1.6	4	5.6	11	5.4	16	4.8
Dementia præcox (Schizophrenia)	5	8.1	19	26.8	103	51.0	127	37.9
Paranoia and paranoid condition	3	4.8	2	2.8	5	2.5	10	3.0
Delirium	1	1.6	3	4.2	1	0.5	5	1.5
Alcoholic psychosis	1	1.6	5	7.0	11	5.4	17	5.1
Syphilitic psychosis	3	4.8	13	18.3	11	5.4	27	8.0
Senile and arteriosclerotic psychosis	6	9.7	12	16.9	10	5.0	28	8.4
Psychosis with mental deficiency	1	1.6	3	4.2	17	8.4	21	6.3
Psychosis with epilepsy and organic changes	2	3.2	..	...	6	3.0	8	2.4
Traumatic psychosis	..	...	..	...	1	0.5	1	0.3
Undiagnosed	21	33.9	..	...	..	...	21	6.3
Total	62	99.9	71	99.9	202	100.0	335	100.1

Among the hospitalized patients the schizophrenic disorders are far the most frequent in both the first admission and old admission groups, but are nearly twice as frequent in the latter as in the former. That is to say, individuals with these disorders not only make up about one-fourth of the first admissions to hospitals (in the 1933 Eastern Health District experience) but, assuming a similar proportionality for the admissions of preceding years, they remained psychotic longer than individuals with other psychoses, and accumulated to the extent of representing one-half of the individuals

who were previously hospitalized and remained psychotic. However, an important factor in this accumulation is undoubtedly a relatively greater duration of life in hospital among schizophrenics than among other psychotics.

In contrast to this, the syphilitic and senile or arteriosclerotic psychoses, next most outstanding among the first admissions, make up a relatively small proportion of the old admissions. It is also of interest to note the small number of manic-depressives, particularly among the first admissions, as compared with the schizophrenics.

B. Analysis of Incidence.

Statistical studies of mental disease deal mainly with hospital admissions and hospital populations. Estimates of the incidence of mental disease are usually determined from first hospital admissions during some time period. It is known of course that such data give a very incomplete picture of the true extent of mental disease at any given time or of the rate at which it first arises.

Since published rates of mental disease usually refer to first hospital admissions, it is useful to examine such rates for the Eastern Health District. However, since the study is not primarily concerned with the fact of hospitalization, but rather with the finding of cases whether hospitalized or not, its data are, as a consequence, rather different in character from those of most published statistical studies of mental disease. One important difference is that admissions to hospitals for mental disease include many non-psychotic disorders, principally epilepsy, alcoholism, drug addiction, psychopathic personality, mental deficiency and psychoneurosis. Despite this fact the total first admissions to hospitals are quite generally used to determine the total incidence of mental disease. But this investigation starts with all discoverable cases of psychosis only, so that when it looks for the number of these that are first admissions to hospitals, it will have ignored the other types of disorders which are admitted to such hospitals. Accordingly, its use of first admissions as a measure of the total incidence of psychosis yields rates that are not comparable with the total rates presented in state and federal compilations nor with those of most of the more specialized studies as well.

In Table 1 it was seen that, among the 335 psychotics discovered in the Eastern Health District in 1933, there were 71 admitted during that year to a hospital for mental disease for the first time. These 71 first admissions, all of whom were over 14 years of age, constitute the material to be analysed here. The crude rate of first admissions per 100,000 of the district population 15 years of age and over was, in 1933, 175.0. In Table 3 are shown the 71 first admissions by type of psychosis, race and sex.

TABLE 3.

FIRST ADMISSIONS TO ALL HOSPITALS FOR MENTAL DISEASE, FROM THE EASTERN HEALTH DISTRICT IN 1933, BY PSYCHOSIS, RACE, AND SEX.

Type of psychosis.	White.		Negro.		Total white.	Total negro.	Total male.	Total female.	Total.
	Male.	Female.	Male.	Female.					
Manic-depressive psychosis	2	0	0	2	2	2	2	2	4
Depression	1	5	0	0	6	0	1	5	6
Involutional melancholia	1	3	0	0	4	0	1	3	4
Dementia præcox (schizophrenia) ..	7	9	2	1	16	3	9	10	19
Paranoia and paranoid condition ...	2	0	0	0	2	0	2	0	2
Delirium	2	1	0	0	3	0	2	1	3
Alcoholic psychosis.	2	0	3	0	2	3	5	0	5
Syphilitic psychosis.	4	0	8	1	4	9	12	1	13
Senile and arteriosclerotic psychosis.	6	3	1	2	9	3	7	5	12
Psychosis with mental deficiency	0	2	1	0	2	1	1	2	3
Total	27	23	15	6	50	21	42	29	71

The numbers of all types of psychosis, by race and sex, of Table 3, are shown in four-fold arrangement, with the district population of individuals 15 years of age and over, and the rates of first admissions per 100,000 of the specified population, in Table 4.

The race and sex specific rates are seen to differ between the two sexes, and, among males, between the two races. To indicate more clearly the relative magnitude of these differences, the ratios of the race and sex population figures to the total population, of

Table 4, were applied to the 71 first admissions to obtain expected numbers of first admissions on the basis of random distribution among the two races and the two sexes. These expected numbers together with the observed numbers of Table 4, are shown in Table 5.

TABLE 4.

FIRST ADMISSIONS TO ALL HOSPITALS FOR MENTAL DISEASE, POPULATION 15 YEARS OF AGE AND OVER, AND RATE OF FIRST ADMISSIONS PER 100,000 OF THE POPULATION, OF THE EASTERN HEALTH DISTRICT IN 1933, BY RACE AND SEX.

Number of first admissions:	White.	Negro.	Total.
Male	27	15	42
Female	23	6	29
Total	50	21	71
Population 15 years of age and over:			
Male	15,667	3,989	19,656
Female	16,558	4,351	20,909
Total	32,225	8,340	40,565
Rate per 100,000:			
Male	172.3	376.0	213.7
Female	138.9	137.9	138.7
Total	155.2	251.8	175.0

TABLE 5.

EXPECTED NUMBER OF FIRST ADMISSIONS TO ALL HOSPITALS FOR MENTAL DISEASE ON THE BASIS OF RANDOM DISTRIBUTION OF THE KNOWN FIRST ADMISSIONS AMONG THE RACE AND SEX GROUPS, AND THE OBSERVED NUMBERS, OF THE EASTERN HEALTH DISTRICT IN 1933, BY RACE AND SEX.

	White.		Negro.		Total.	
	Exp.	Obs.	Exp.	Obs.	Exp.	Obs.
Male	27.4	27	7.0	15	34.4	42
Female	29.0	23	7.6	6	36.6	29
Total	56.4	50	14.6	21	71.0	71

Comparing these expected numbers with the observed numbers, it is seen that the observed show principally a great excess of negro males. Under the Chi-squared test, the observed show a significant departure from the expected ($p=.014$), but practically all of the Chi-squared value is contributed by the negro male difference.

Since the rates presented in Table 4 are the best estimates it is possible to make at present of the 1933 incidence of psychosis in the Eastern Health District, as measured by first admissions of psychotics from the district to hospitals for mental disease, it will

TABLE 6.

FIRST ADMISSIONS TO ALL HOSPITALS FOR MENTAL DISEASE IN FOUR SUCCESSIVE YEARS, AND MEAN NUMBER OF ADMISSIONS PER YEAR, FROM THE EASTERN HEALTH DISTRICT BY RACE AND SEX.

	White.		Negro.	
	Male.	Female.	Male.	Female.
1933	27	23	15	6
1934	27	20	10	8
1935	23	17	6	5
1936	24	17	9	6
Mean per year	25.25	19.25	10.00	6.25

be of interest to examine briefly certain questions regarding the reliability and representativeness of these 1933 first admission figures.

One approach to this is through the comparison of Eastern Health District first admissions for successive years. The numbers of first admissions of psychotics from the Eastern Health District to hospitals for mental disease for the years 1934, 1935, and 1936, together with the 1933 first admissions, and the mean number of admissions per year for the four years, by race and sex, are given in Table 6.

It seems worth emphasizing at the outset that the significance of the variability shown by the data of Table 6 is extremely difficult to determine. There seems little doubt that the differences from year to year are the results of the interplay of a large number of diverse factors, not the least important of which is, very likely, fluctuations in the availability of hospital accommodations for different race and sex groups in different years. It appears evident that at present there are no means of analysing these vari-

ous factors in quantitative terms, and that explanation of the observed diversities must be sought, not only in the usual biological variability in incidence, but also in such facts as the varying personal and economic circumstances under which a particular psychotic individual is or is not committed to a hospital, or being committed, does or does not in fact enter the hospital.

However, in both races the relative differences between the sexes in any one year are regularly repeated in every year: In each of the four years whose first admission figures are given in Table 6 there are fewer females than males of each race, despite the fact that, as the 1933 population figures indicate, there are more females than males in the population, in each race.

TABLE 7.

RATE OF FIRST ADMISSIONS PER 100,000 OF THE 1933 POPULATION 15 YEARS OF AGE AND OVER, OF MEAN ANNUAL NUMBER OF ADMISSIONS OVER A FOUR-YEAR PERIOD, OF THE EASTERN HEALTH DISTRICT, BY RACE AND SEX.

	White.	Negro.
Male	161.2	250.7
Female	116.2	143.6

Rates determined from the mean annual first admissions of Table 6 and the 1933 population figures are given in Table 7. The general relations shown by the rates of Table 4 are again indicated clearly in these more stable averaged rates: The male rates are higher than the female rates, those of the negroes higher than those of the whites, and the negro male rate is again very high.

C. ANALYSIS OF PREVALENCE.

The total psychotics of Table 1 represent, perhaps, as complete an appraisal of the number of discoverable cases of psychosis for a definitely circumscribed area of known population composition as has yet been reported. Accordingly, it seems desirable to establish for this area as accurate a prevalence rate as can be determined.

For this purpose, the question of what portion of the population in regard to age they are to be based on needs careful attention. A complete analysis of this problem requires consideration of the greatly different age incidences of the various psychoses, but, for

the type of rate with which this paper is at present concerned—the total prevalence of all psychoses—these differences are of somewhat less importance than the minimum age at which psychoses of any kind occur. Psychoses among children are rare and it is clear that basing rates on the population of all ages is wholly unsatisfactory. This fact is quite generally recognized and the usual practice in the determination of rates of mental disease is to consider the population under 15 years of age not in the "exposed to risk" group.

The 335 psychotics discovered in the Eastern Health District in 1933 include three children less than 15 years of age, all of whom were negroes. The disorders they represent are (1) a toxic delirium in a girl of seven; (2) symptoms of early schizophrenia in a boy of nine; and (3) post lead encephalitis in a boy of 14. None of these was hospitalized. The three cases represent less than 1 per cent of the total cases, whereas in 1933, 32.5 per cent of the negro population of the district were under 15 years of age, and over 21 per cent were in the age group 5 to 14. It is obvious that any rates not specified for relatively narrow age groups, which included these three children and the broader age groups that include them, will be greatly distorted. On the whole, it seems that the safest course is to omit the three children and the whole age group less than 15 years of age in determining any rates except those specified for single years of age, which, of course, are not feasible to use where the total cases number only a few hundred.

In Table 8 are shown the remaining 332 cases, the population 15 years of age and over of the district, and the rate per 100,000 of the population, by race and sex.[4] The most striking facts shown by these rates are the high degree of uniformity among white males, white females and negro males, and the very great relative defi-

[4] For comparison with other published rates, *e.g.*, those in the Bureau of the Census publication: "Patients in Hospitals for Mental Disease, 1933" (Table 9, page 17), the crude rate of patients in hospital is, for the Eastern Health District in 1933, 451.4 per 100,000 of the total population. This, however, includes private hospital patients, but on the other hand is not adjusted to show the proportion in hospital as of a single day. Likewise it should be recalled that only psychotics are included, not total hospital patients. The crude rate of all psychotics of the district, both in and out of hospital, is 597.7 per 100,000 of the total population.

ciency of negro females. It will be of interest here to examine separately the prevalence rates for the two wards of the Eastern Health District. They are, roughly, equal in size and total population, but greatly dissimilar in their proportion of negroes. In 1933 the negro population of Ward 6 was 15.5 per cent of its total, about equal to that of the negro population of Baltimore City as a whole, while the negro population of Ward 7 was 28.2 per cent of its total.

TABLE 8.

NUMBER OF CASES, POPULATION 15 YEARS OF AGE AND OVER, AND PREVALENCE RATE PER 100,000 OF THE POPULATION, FOR THE EASTERN HEALTH DISTRICT IN 1933, BY RACE AND SEX.

	White.	Negro.	Total.
Cases:			
Male	137	33	170
Female	145	17	162
Total	282	50	332
Population 15 years of age and over:			
Male	15,667	3,989	19,656
Female	16,558	4,351	20,909
Total	32,225	8,340	40,565
Rate per 100,000:			
Male	874.4	827.3	864.9
Female	875.7	390.7	774.8
Total	875.1	599.5	818.4

The prevalence rates for the two wards, determined in the same manner as those of Table 8, are shown in Table 9. The two wards are seen to differ in prevalence of psychosis, the rates for Ward 6 being appreciably higher than those for Ward 7, except in the case of negro females, where this relationship is reversed. In Ward 6, despite the higher rates generally, as compared with the whole district or with Ward 7, the negro female rate is even lower. In Ward 7, on the other hand, the negro female rate is not only higher than that of the whole district, but its difference from those of the other groups of the same ward is somewhat less. Of the 17 negro female psychotics, 4 were from Ward 6 and 13 from Ward 7. On the whole these rates show that the deficiency of negro females exists in both wards, so that by virtue of this fact, the probability

of its being due only to chance is somewhat lessened. At the same time, much the greater part of the deficiency is found in one ward.

The necessity indicated here of stating rates for the two wards separately is of interest. These two areas are known to be highly similar in many characteristics: They are contiguous and separated by a wholly arbitrary and artificial boundary, and so far as gross

TABLE 9.

NUMBER OF CASES, POPULATION 15 YEARS OF AGE AND OVER, AND PREVALENCE RATE PER 100,000 OF THE POPULATION, FOR EACH OF THE TWO WARDS OF THE EASTERN HEALTH DISTRICT IN 1933, BY RACE AND SEX.

	Ward 6.			Ward 7.		
Cases:	White.	Negro.	Total.	White.	Negro.	Total.
Male	82	14	96	55	19	74
Female ..	89	4	93	56	13	69
Total.	171	18	189	111	32	143
Population 15 years of age and over:						
Male	8,101	1,369	9,470	7,566	2,620	10,186
Female ..	8,578	1,456	10,034	7,980	2,895	10,875
Total.	16,679	2,825	19,504	15,546	5,515	21,061
Rate per 100,000:						
Male	1012.2	1022.6	1013.7	726.9	725.2	726.5
Female ..	1037.5	274.7	926.8	701.8	449.1	634.5
Total.	1025.2	637.2	969.0	714.0	580.2	679.0

inspection can reveal, are indistinguishable in general economic, social and geographic features. Accordingly, the difference between them in prevalence of psychosis seems worth particular attention from both the psychiatric and sociological points of view. Detailed examination of the social and economic factors operating in the two wards is now being made and will be presented in a later paper of the series.

However, one other point needs to be discussed here. In connection with these questions, and likewise for reasons of wider interest, it is highly desirable to consider the rates specified by age. But the number of cases per year of such a limited area as the Eastern Health District, particularly among the negroes, is so small that their distribution over several age groups provides age

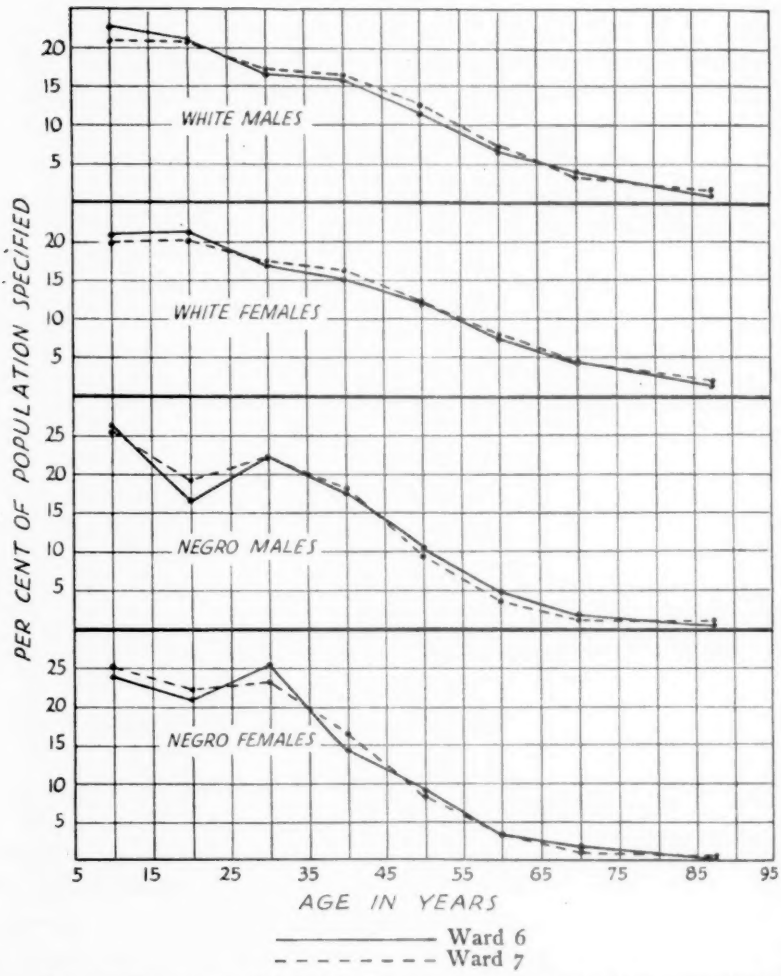


FIG. 1.—Percentage distribution by 10-year age groups, of the population 5 years of age and over of each race and sex group, in the two wards of the Eastern Health District in 1933.

specific rates of great instability and very doubtful significance. Nevertheless, the possibility that the difference in prevalence of psychosis between the two wards may be associated with differences in the age composition of their populations demands further examination.

The question is answered directly and fairly definitely in Figure 1, which shows, for each race and sex group, the percentage distribu-

TABLE 10.

NUMBER OF CASES, POPULATION, AND PREVALENCE RATE PER 100,000 OF THE POPULATION, OF WHITE MALES AND WHITE FEMALES, FOR EACH OF THE TWO WARDS OF THE EASTERN HEALTH DISTRICT IN 1933, BY 10-YEAR AGE GROUPS.

		Ward 6.			Ward 7.		
	Age group.	No. of cases.	Population.	Rate per 100,000.	No. of cases.	Population.	Rate per 100,000.
Male	15-24	6	2156	278.3	6	1933	310.4
	25-34	22	1706	1289.6	11	1604	685.8
	35-44	14	1634	856.8	11	1505	730.9
	45-54	23	1188	1936.0	12	1162	1032.7
	55-64	12	698	1719.2	8	663	1206.6
	65-74	4	395	1012.6	4	325	1230.8
	75 and over	1	101	990.1	3	116	2586.2
	Total	82	7878	1040.9	55	7308	752.6
Female	15-24	9	2251	399.8	3	1959	153.1
	25-34	18	1787	1007.3	10	1658	603.1
	35-44	23	1606	1432.1	15	1554	965.2
	45-54	20	1272	1572.3	11	1173	937.8
	55-64	9	781	1152.4	9	737	1221.2
	65-74	8	456	1754.4	3	426	704.2
	75 and over	2	155	1290.3	5	162	3086.4
	Total	89	8308	1071.3	56	7669	730.2

tion by ten-year age groups of the population five years of age and over in the two wards. The very great similarity in age composition of the populations of the two wards is shown clearly in these graphs, and there seems to be little doubt that the possibility of differences in this respect can be put aside.

The distribution of the white cases over ten-year age groups is much less erratic than that of the negro cases, so that age specific rates for this race for the two wards may be presented. In Table 10

are shown the number of cases, the population, and the rate per 100,000 of the population, of white males and white females by ten-year age groups, for each ward of the district. The total rates of each sex in each ward are seen to differ from the corresponding rates in Table 9. This is due only to the fact that in Table 9 the base population of each group includes a certain number of adults of unknown age who must, of necessity, be omitted from Table 10.

The principal value of the data of Table 10 lies in the use of the age specific rates to form age corrected rates by which the two wards may be compared. Using as a standard population that of the two wards combined (*i. e.*, of the Eastern Health District as a whole) the age corrected rates shown in Table 11 were determined.

TABLE 11.

AGE CORRECTED PREVALENCE RATE OF WHITE CASES FOR EACH OF THE TWO WARDS OF THE EASTERN HEALTH DISTRICT IN 1933, AND THE DIFFERENCE BETWEEN WARD 6 RATE AND WARD 7 RATE, BY SEX (WITH STANDARD ERRORS).

	Ward 6.	Ward 7.	Diff.
Male	1051.6 ± 106.4	747.4 ± 110.4	304.2 ± 153.3
Female	1077.8 ± 103.6	720.4 ± 107.8	357.4 ± 149.5

The very great similarity between these age corrected rates and the corresponding crude rates of Table 10 may be taken as evidence that the similarity in age composition of the two wards shown by the graphs of Figure 1 is a valid indication of that fact. Despite the unfeasibility of computing such corrected rates for negroes because of their small numbers, it may be inferred from the graphs and their supporting evidence in the rates of Table 11, that the difference between the rates for negroes in the two wards is likewise not associated with differences in age composition of the populations of the two wards.

At the same time, the difference in prevalence between the whites of the two wards is to some degree further validated by these age corrected rates. As can be seen from the table, the difference between the rates of white males for the two wards is 1.98 times its standard error; for females the difference is 2.4 times its standard error.

Discussion.

The prevalence rates of psychosis presented in this paper are offered as a comparatively new contribution in the field of mental hygiene statistics. It is apparent, however, that the total amount of psychosis discoverable in an area cannot at present be set down even as an indication of the total amount actually existing in that area at some moment of time, since no measure of the cases not discoverable is yet available. Accordingly, the prevalence rates that have been determined must be considered as minimum rates at best. But there seems little doubt that they are truly minimum rates—that the amount of psychosis in the Eastern Health District in relation to its population is at least of the magnitude shown by these rates. In view of the practice often encountered of using incidence rates determined from first admissions to hospitals as measures of prevalence also, the demonstration of minimum rates of prevalence for the Eastern Health District that are, very roughly, in the neighborhood of five times its rates of first admissions appears to be a fact of general interest and usefulness.

As regards incidence, the rates calculated for the Eastern Health District make use of the first admissions to hospitals of patients with recognized psychoses only, omitting, as other reports presenting total incidence rates of all mental disease fail to do, patients without psychoses. These rates are, accordingly, not directly comparable to those given in other reports, a fact which it is important to emphasize.

However, in the general relations of incidence among the different race and sex groups, the Eastern Health District rates are in agreement with those for most other areas, showing male rates higher than female and negro rates higher than white. The very high negro male rate attracts particular attention. In Table 3 it is seen that, of the 15 negro male psychotics, eight had syphilitic psychosis, so that the magnitude of this group's rate in 1933 is due largely to a relatively high frequency of general paresis and cerebral syphilis. No single type of psychosis is shown by nearly as great a proportion of the first admissions among the other race and sex groups as this. Three of the ten 1934 admissions and two of the six 1935 admissions of negro males, in each case about one-third,

were syphilitic. In 1936, five of the nine negro male first admissions, again about one-half, were syphilitic. However, considering the small number of cases here, the drop during 1934 and 1935, representing differences of only one or two individuals, is of little importance.

But the real significance of such details cannot be determined until the survey has been extended to include other years. This, in fact, is true of all the material and of the indexes that have been presented. The ultimate value of a study which examines a small area during a relatively brief time period lies mainly in the opportunity it affords eventually to determine, by the regular repetition of comparable studies, general trends over long time periods, and their usefulness toward that end depends upon how completely and precisely they describe the immediate facts with which they are concerned. Accordingly, this paper is offered primarily as a step toward setting up methods by which such accurate descriptions may be attained.

Summary.

1. The rate of first admissions of psychotics to hospitals for mental disease from the Eastern Health District in 1933 is 175.0 per 100,000 of the population 15 years of age and over. The race and sex specific rates are: white males, 172.3; white females, 138.9; negro males, 376.0; negro females, 137.9. The negro male rate is significantly different from the others, and the difference seems to be due to an exceptionally high proportion of syphilitic psychosis in that group.

2. The average rates of first admissions per year, for the years 1933 to 1936 inclusive are: white males, 161.2; white females, 116.2; negro males, 250.7; negro females, 143.6.

3. The prevalence of psychosis in the district in 1933, as measured by all discoverable cases who could be allocated to the district, is 818.4 per 100,000 of the population 15 years of age and over. The race and sex specific rates are: white males, 874.4; white females, 875.7; negro males, 827.3; negro females, 390.7. The relative deficiency of negro females cannot be explained.

4. The two wards of the district differ appreciably in prevalence of psychosis. The rates are:

	Ward 6.	Ward 7.
White males	1012.2	726.9
White females	1037.5	701.8
Negro males	1022.6	725.2
Negro females	274.7	449.1

5. The differences between the two wards are not associated with differences in age composition of the populations of the two wards. No explanation for the differences has yet been discovered, but the general fact appears to be one of importance to psychiatry.

THE ORGANIC BACKGROUND OF OBSESSIONS AND COMPULSIONS.*

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Obsessions and compulsions have been repeatedly observed in epidemic encephalitis. Such may occur in acute cases as in the observation of Mayer-Gross and Steiner. The majority of cases are either sub-acute or chronic (*cf.* for instance Hermann, Thiele, Bürger, Bromberg, Jelliffe, L. Bender). Of particular interest are the obsessions and compulsions observed in cases with oculogyric crisis (Stern, Stengel, Jelliffe). Jelliffe has not only collected the whole literature on the subject but has also added valuable observations of his own and has especially pointed to the personality factors which determine, in connection with the encephalitic process, the oculogyric crisis and the contents of the obsessions and compulsions in these cases. The subject has lately been reviewed by Wexberg. It is obvious that the organic disease of the central nervous system is an indispensable factor in the genesis of the psychic symptoms, which have been mentioned. If one reviews the cases in the literature carefully and compares them with one's own experiences, one sees that although infantile experiences and situations have created a pattern, it finds its expression in compulsions on the basis of the organic processes involved. Such a statement cannot fully be substantiated since no reliable methods are available at the moment by which we are able to predict the consequences of infantile patterns. Comparative studies of analyzed cases of obsession neurosis and obsessions and compulsions on an encephalitic basis have led me to the conclusion I have formulated.

The encephalitic process liberates motor impulses and motor innervations. Release phenomena of this kind are for instance the oculomotor spasms, the palilalia, the tic-like movements, the choreic and choreiform phenomena and finally all the impulse phenomena

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which are comprised under the heading of hyperkinesis. Forced movements of any type even when they occur on a purely somatic basis represent increased innervation and increased activity and have their reflection in the psychic sphere as increase of impulses which reinforces sadistic attitudes. This is true concerning epileptic attacks (which do not concern us here) as well as for oculogyric crises. Akinetic states and rigidities which restrict impulses and movements dam up impulses which may originate in other levels. These dammed up impulses will finally break through with great violence. Impulsive actions of more or less sadistic character are common in these cases. When they are checked, compulsive phenomena may result. Hyperkinetic phenomena of all levels may lead to compulsions and obsessions. However, akinetic phenomena may lead indirectly to the same result. Compulsions may so originate from motor sources in the widest sense. It is necessary to keep in mind that there exists a direct connection between compulsions (the urge to actions towards which the individual resists) and obsessions (thoughts and representations which maintain themselves in the consciousness of the individual contrary to his intention). A Polish Jew of my observation felt the urge when crossing a street to call out that he is an illegitimate child. He suppressed this impulse and was afterwards tortured by the obsession that he had done so. The obsessive thought substituted the repressed impulse.

I have observed postencephalitic cases in which obsessions had a different genesis. In these cases the patients experienced a change in the state of consciousness in which thoughts and representations were going through their minds and persisted against their wishes. The change in consciousness during oculogyric crisis is a factor which has to be considered for the genesis of compulsions and obsessions observed in these states. Stengel has proved that the vestibular function is changed during the oculogyric crisis. The vestibular function influences the tone and the motor impulses. Studies of Hoff and myself have shown that the change in the function of the vestibular apparatus changes the state of consciousness. There exists therefore a close interrelation between the impulses, the tone, the vestibular apparatus, oculomotor mechanism and the consciousness. Such considerations may lead to the better understanding of a postencephalitic case in which the patient complained

that she saw dirt everywhere. She said that everywhere there were dark spots. She had to clean her house continually although she was rather convinced that there was no dirt. She felt particularly uneasy when she saw regular patterns on the pavement or somewhere else and dizziness followed. There was a similar uneasiness when confronted with any complicated optic situation. When she was turned around on a swivel chair she saw more and more dirt. Irrigation of the ear had no specific effect. The patient showed a mild akinesis and rigidity but a particular difficulty in her eye movements. She improved under fever therapy but came back later complaining that everything was glittering before her eyes so that she felt dazzled.

The following case may illustrate the relation between impulses originating from encephalitis and compulsion phenomena.

CASE I.—Yvette R., 30 years old, complained that she is compelled to think the whole day. "It is not true that I am lazy—it is not true that nothing interests me. It keeps repeating in my mind. I keep on telling to myself the cockeyed world can go to hell. I have to count the pin holes in everything I see. When I look at something I say how many pin holes are there?" The patient complained that she asks herself concerning every object of how many pin holes it consists. However, she does not try to count.

The patient had a typical encephalitis when she was 15 years old. She was sick for six weeks. A slight rigidity and akinesis remained. She married five years ago. She was worrisome all her life, even before the encephalitis. About three years ago she gave birth to a boy. During her pregnancy she worried she wouldn't be able to take care of the baby. When she came home from the hospital she was so upset that she tried to kill herself with roach poison. She was then sent to a sanitarium. There she developed the fear she might go crazy. She blamed herself that she was the most selfish person in the world. At this time, one of her sisters B told her that she had been lazy all her life. An older sister E admonished her that she should have more interest in the world. Immediately after that the compulsions to say "it is not true that I was lazy all my life and it is not true that nothing interests me" developed. When she complained to her husband he said that she should send the whole cockeyed world to hell. This led to the other compulsion. Several months later she accidentally stuck a pin through the bed sheet in her child's crib. She developed immediately after that the compulsion to count the pin holes. It turned out that she was afraid she might stick a pin in the body of her child.

When the obsessions came she started also to repeat words and short orders again and again. Her appetite disappeared and she didn't sleep well.

During the discussions she talked in terms of exaggerated affection for her husband and for her child, of whom she speaks as honey and darling. She likes also to call the analyst to whom she clings darling. She shows a very outspoken palilalia. This becomes particularly manifest when she reports about her obsessions. She repeats sometimes the beginning of the text but more often the end. She also repeats orders she gives to her baby, especially when they are short. She reports that she gave up religion when she married since her husband is now her God. She declares that she loves her child and husband dearly and that she loves everybody. "I love the whole world." She complains that she is slow in her movements and that she remains sometimes for a long time in frozen attitudes.

The somatic examination shows that the patient has a typical Parkinsonism of medium degree. The rigidity of the face is outspoken. The palilalia is severe. There are no other somatic findings.

The psychoanalytic approach was difficult but a strong attachment to the father going back in early childhood came to the foreground. She was his favorite child and worried very much about his diabetes to which he succumbed when the patient was 13. She was occasionally spanked by her mother whom she disobeyed often. She had little contact with two brothers and a sister much older than herself. She had many fights with her sister E who is four years older and her sister B who is four years younger. She slept with B in one bed. She would often hit her sister B when she didn't obey her.

One of her earliest remembrances is that her sister E wanted to cut off the finger of B and was spanked by her mother. She was also often hit by her sister E. In one of her dreams, one of her nieces wanted to marry a girl. One of the patient's girl friends appears continually in her dreams which are filled with activity. There are also dreams of being held against her will. In one of her dreams she says to her sister E "the whole cockeyed world can go to hell and you too." E kicked her out of the house and told her not to come back again. Her early history is filled with accidents. At three the stick of a lollypop pierced her lips. She burned herself with hot tea and ripped her behind when she slid down a staircase. She hurt her head when she was five. The patient thinks that she was wonderful before the baby arrived. There were frequent worries about money at the beginning of her marriage.

The patient was a lively and aggressive child. We have reason to believe that there were homosexual trends present in her relation to her sisters. A great amount of hostility was in her before she acquired encephalitis and before she gave birth to her child. The hostility against her child was obvious in the pregnancy to which the patient answered by self accusation and depression. After the birth it finally led to a suicidal attempt. It is probable that the akinesis was present before her pregnancy. Her fear of laziness and inactivity comes into appearance with childbirth. There is an increase of impulses in the speech function which leads immediately into the compulsions which express directly and indirectly hostilities against her sisters and her child. She overcompensates her hostilities against others by praising them

beyond measure. She heaps all the blame upon herself. Psychotherapy and benzedrine did not cure the patient but she learned to send the cockeyed world to hell with greater ease.

It is easy to see in this case the relation of the change in the motility to the expression of hostile impulses and compulsion. The connection between compulsion and obsession and the motor impulses is not always so clear, but more careful examination of these cases shows very often an intimate relation between impulses and the compulsion.

In spite of the fact that such an obvious connection exists between the impulse disturbance on an organic basis and compulsions, the question rarely has been raised whether it isn't possible to find an organic background for obsession neurosis cases in general. Naturally in the majority of cases there is no history of epidemic encephalitis. If one examines a large material of obsession neurosis cases, one finds not so rarely organic symptoms identical with those found in chronic encephalitis. In the comparatively short time of about two years I have seen seven cases in which slight organic signs could be found in careful examination and in two other cases there was at least some clinical evidence that impulse disturbances on an organic basis were present. The symptoms which are of particular importance in this connection are the following ones: 1. Rigidity of the face and mask-like facies. It is true that an objective appreciation of the mobility of the face is not always easy. When two independent observers agree on this point one might use this symptom if it is not isolated as corroborative evidence. 2. Evidence of flexor rigidity in the arms. We shall generally not expect that cases of this type will show a very outspoken Parkinsonism. Even the cogwheel phenomenon may not be present. Hoff and I have described the so-called convergence phenomenon of the arms. The phenomenon has to be tested as follows: The arms are out-stretched parallel to each other and the patient is ordered to keep his eyes closed. The sign is positive if the hands come nearer to each other. This sign is due to a flexion in the elbow. When merely one arm is tested, the flexion is present too. If both arms are tested one has to take into consideration that the arms diverge in the normal subject. The normal divergence and the convergence on the basis of flexor rigidity may compensate each other. The sign is a reliable help in detecting slight Parkinsonian features and

points to an organic lesion of those parts of the brain which are affected in Parkinsonism, and Parkinson. The sign is present in alcoholics when in the state of an acute intoxication and may disappear with the recovery. Although it is very often combined with tremor it may be present without tremor, and tremor may be present without convergence. 3. Tremor of an organic type is an important symptom, even if the tremor is slight. 4. If the convergence of the eyes is impaired (when exophoria is not present) further evidence for an organic process is hardly necessary. However, in the majority of the cases studied here, a decided evidence of impaired convergence could not be given. 5. Great urge to talk and propulsive features in speech are of paramount importance. 6. Hyperactivity and motor urges of higher degree should be considered as confirmatory evidence. Also the history of hyperactivity in childhood should not be neglected. 7. Outspoken rigidities, propulsion and retropulsion, higher degrees of akinesis and catalepsy can hardly be expected in cases of this type. Persistence of tone described by Hoff and myself has not been observed in any one of these cases.

I have observed seven cases of obsession neurosis in which organic signs of the type described here were present. Only a few of these cases will be discussed in detail.

Case II.—Emanuel P., 26 years old, came with the complaint that he is afraid of dogs and cats. They instill awe and disgust in him. Since the age of five he is afraid that dogs might come near him and bite him. He is particularly afraid that his penis might be hurt. By the mere contact with dogs his skin might become like the skin of a dog. His fear of cats is less intensive as the fear of dogs. For many years he cannot eat food when his mother tasted it first before serving. The food might be infected by the saliva of the mother. Furthermore, he is continually plagued with the idea that he might not be clean enough and spends hours in the bathroom, washing his hands again and again. Fears of this type go back to the age of 14.

The patient is small, almost dwarfed. His movements are quick and jerky. He talks incessantly with a loud voice and in a propulsive manner. He repeats very often what he has said but this is not a palilalia. He salivates and spits a little while talking. His face is a little rigid. There is a slight tremor of the head and of the fingers. There is no convergence of arms. The eye convergence is good. The pupils react at the present time but during an examination three years prior the pupils were found slightly irregular and almost stiff. When the patient was 12 years old he suffered from a period of sleepiness and was called "sleepy head" and "dopey" in school. A tentative diagnosis of encephalitis was made but not definitely substantiated. As the later

discussion will show he was at that time in a particular psychic strain. He complains often about a pain in his left side, about headache and dizziness. A careful checkup showed that there was no somatic basis for these complaints.

The patient lives with his family the social status of which is rather low. He has two younger sisters who work. The father is often unemployed. The patient himself worked for only a short time during his life as a messenger boy. He lives in constant conflict with his family. For years he was treated in different out-patient departments and was for several months in Central Islip, a state hospital.

As mentioned, he stays in the bathroom for a long time and cannot stand any interruption. He cannot defecate thoroughly when someone is near the bathroom. He washes very carefully and is in fear of being contaminated by germs. When the process of washing is interrupted he begins all over again. When his mother tastes the food she is cooking and puts the spoon again into the food he cannot eat it. He is afraid of being poisoned by the germs which might be contained in the saliva of his mother. He is very sensitive. He feels continually attacked by everybody. People on the street say to him "Hey Red." He is afraid they might beat him. He is also continually afraid that the analyst may make fun of him. He is also afraid that the other patients might laugh at him. He comes to his appointments mostly late and reacts with a great anger if the physician is not able to see him when he comes three or four hours late. He left the treatment in great anger. During the treatment, which lasted several months, his ambivalence was very outspoken. Love to the analyst was combined with fear and violent outbursts of hate when he felt rejected. It was always difficult to finish a session since he clung to the analyst asking question after question and demanding that the answers should be repeated again and again. The patient repeated everything he said several times insisting that he had to repeat in order not to be misunderstood. He liked to write and wrote a long autobiography and long reports in which repititions occurred very frequently.

I quote a few sentences in a report he wrote about an encounter with a cat. "I opened the door and the cat ran out and when I saw the cat run out I ran also because I was very much afraid that the cat is after me and will attack me if I do not run. Then I saw the cat run away from me. I ran after the cat so that the cat will not be at the building where I live, so as not to come into the building where I live. Then I felt my legs shaking and I felt my legs weak." It speaks for the deep-sitting character of his tendencies to repetition that the patient repeatedly dreamed the same dream twice in one night. I do not hesitate to consider the motility and the impulses of this patient as organically determined. However, the ambivalence reinforces many of his motor trends, his doubts and his tendencies to questioning.

His whole sex interest centers around the anal region. He is particularly interested in the anus as such and in the region between the buttocks. This attitude can be traced back to his fourth year when he had scarlet fever and got an enema from his mother. He could not urinate at that time and an onion was put on his penis. When he came to the hospital at 11 because of functional heart trouble he was greatly interested when he saw the

nurses give enemas to other children. He liked to fancy himself in the same situation and got sexual pleasure out of such fantasies. Since his 14th year he masturbates thinking of a teacher's rectum, "associating her rectum with a female rectum who gave a child an enema which I had observed." He also had a fantasy of a female giving him an enema. He felt that the "rectum" of females is broader and by getting an enema his rectum would become broader too and like the rectum of a female. He would be so transformed himself into a female. He is extremely interested in seeing these parts of women. He is also interested in smelling the places where women have been sitting. This interest goes back to his fifth year. He has often wishes and fantasies that his father should insert his penis into his rectum. Many dreams and fantasies make it clear that the muzzle of the dog, the dog itself, the penis and feces are equivalent in his mind. He therefore tends to be passive towards his father and his sex organ and towards women who are endowed with a symbolic penis (the nozzle of the enema).

He reports that he loved his father very much when he was small and that his father was very good to him. He occasionally has sexual dreams about his father as spilling semen on the chest of his father. Around his fifth year the father became a menace to him. He is afraid of his father's looks and when his father is angry he is afraid that his father may bite his penis off. The patient reports this with decided gusto and even reports that he has voluptuous sensations in his sex organ when threatened by his father or anybody else. Even the repetition of the story gives him sexual pleasure. He very often has the wish to attack his father with an axe from behind and kill him. Sometimes he wants to choke his father and is afraid his father might choke him. He also has hostile impulses against his mother and sisters. His fear of dogs goes back to his 4th year. He says that dogs have a grim expression in their faces and uses in a description of dogs the same words as he uses in describing his father. He is also afraid of being infected by dogs and to become like a dog if he touches one.

The patient is conscious of his being short, weak and helpless. His autobiography begins "when I was born I was told by my mother and father that I was a short baby." "I used to throw my feet up and down nervously and make nervous motions with a rattle."

The parents obviously were very conscious of the size and weakness of the child and later on became annoyed by his hyperkinetic aggressiveness. Around the fifth year of the patient the counter aggression of the parents was in full swing. At this critical age a scarlatina occurred which led to the handling of the penis and of the anus of the patient by his mother. The passive attitude of the patient mingled immediately with anal and especially sexual motives and the definite pattern was established. The persistent hyperkinesis sharpened the conflicts with the parents. The sexual problems reawakened in connection with hospital experiences before puberty, the anal pattern was reinforced and sexual excitement and masturbation led to preoccupation and sleepiness. His present attitude towards dogs runs parallel to his attitude towards his parents. An early love for a white dog was substituted

by the fear of brown dogs. He is now in a world which continually threatens him. The threats coming from father and mother are the threats that he might be cut to pieces and dismembered and especially that he might be deprived of his sex organs. He is furthermore threatened by the saliva of his mother which is poisonous and contains germs. Uncleanliness becomes the general expression of threats coming from excretions of any other person's body. Semen and feces also become formidable. Animals are a combination of the danger coming from direct attack and secretion. They bite and are unclean.

It is obvious that in this psychological development the increase in the motor impulses is of paramount importance. However, the body configuration of the patient in its effect upon the parents and the attitudes of the parents in general are of decisive influence on the further development of this severe neurosis. This is the only case of this group in which the therapeutic effort was without any result.

The obsessional neurotic patient who complained of being too small, mentioned in my paper on ideologies, who had compulsions to curse God and make at the same time movements with his feet, showed a rigid face, a propulsive speech, a slight tremor of the hands and especially of the eyelids. His cursing was obviously in connection with strong motor impulses, not only concerning his speech but also his feet. In his early history, consciousness of his smallness, homosexual attachment to his father and fight against the father play an outstanding part. He makes the movements with his toes three times. He has the urge to touch everything, especially the female breast. There are compulsions to use obscene words. The verbal attack is obviously the pre-cursor of a physical attack which ends in the anal intercourse with the defeated love object.

The 33-year-old Frank M. suffers from severe anxiety states. He had been analyzed for about 2½ years by other physicians. He has compulsions to cut women into pieces, to tear out their sex parts and to devour them either in parts or as a whole. He has similar impulses towards the analyst. He has a compulsion to count. "I count and think in my mind. Also Napoleon has counted windows. I count the corners and borders of every piece of paper. Then I count the planes and break everything in my thoughts. I would like to smash everybody to pieces and urinate upon them." Counting means for the patient to tear and to break into small pieces. This means also a destruction of the human body. The patient has a rigid face, and an enormous urge to talk. In his childhood he was exposed to the attacks of older brothers. He was weak and continually threatened. In addition, he was an hyperactive child and came continually in conflict with his mother.

The 34-year-old Archibald B. has the urge to assault women and kill his wife. Sometimes he wants to assault the women sexually. The idea of killing appeared at first four years ago in a dream. The patient has a slight quick tremor in his left hand which has also a tendency to convergence. There is also a tremor of the eyelids.

Frank B., 30 years old, complains about slight depersonalization symptoms. He complains that he has to count his footsteps. He cannot decide in what direction to walk. He has the urge to explain his symptoms continually to the doctor whom he imagines. Physical examination showed a tremor of the hands and a decrease in the associated movements of the right arm. There is some stiffness in the posture and in the face. The convergence of the left eye is decreased. His speech is slurred and propulsive and there is a staring look in his face. There is no history of encephalitis. This case has not been fully investigated from a psycho-genetic point of view. There are merely slight compulsion symptoms (counting of steps) obviously in connection with an impairment of the motor function. The patient complains bitterly that he has to give constant attention to his staring and to his stiffness. This case reacts obviously to the impairment of the motor function with a compulsive attention to this function.

Alfred R., 30 years old, had the compulsive thought that he is an illegitimate child and that his mother had sex relations with another man whom he identified. He had the compulsion to kill his mother. The borderline from compulsion to delusion was not sharp. There was a slight tic movement of the head which disappeared. At the present time he feels the urge to move his head in this direction without giving in. The patient has a rigid face. The right side of the face is particularly akinetic.

Edward T., 21 years old, has an outspoken compulsion to wash. He has a rigid face, a tremor of the outstretched hands, a marked degree of akinesis, paralysis agitans posture without rigidities but a slight convergence of the arms. In the early history anal and sadistic trends were outspoken. It was not possible in the comparatively short observation to establish a psychological connection between organic impulse disturbances and the washing compulsion.

In all the seven cases quoted, organic signs are present pointing to organic lesions of the brain, partially identical in localization with the symptoms of encephalitis. Four of the cases show evidence of an increase in impulses which is in obvious connection with the psychological determinants of the compulsion. In two of the other cases, the self observation of disturbances in motor impulses forms the basis for obsessive self observation. However, the connection with impulse disturbances and obsessional symptoms is not as obvious as in the other cases. In the 7th case, no definite psychological connection could be made between the motor disturbance and the obsessive picture.

If one studies the characteristics of these cases in which organic signs are obvious, one sees in many other cases clinical and psychological characteristics which make it at least probable that a similar impulse disturbance on an organic basis is at work.

CASE III.—Ruth S., 32 years of age, had been in analysis for more than five years before she came to my observation. She suffers from a fear that she may have killed others with poison. She thinks she may have gone without her knowledge into a drug store or into the bathroom and may have mixed there the drugs. When she passes a drug store she is not sure whether she had not gone in. She is also haunted by the obsessional fear that she may have kicked automobiles and automobile drivers causing terrible accidents. Furthermore, she believes that she has kicked persons in manholes and has destroyed gas pipes and electric wires by her action. The obsessions go back to her 18th year. She often has death wishes against her husband, the relatives of her husband and her mother. She is also otherwise a good hater. In connection with her obsessions she suffers from time to time an undescribable pain which is localized in the abdomen but different from somatic pain and is comparable to a feeling of terrible emptiness. She experienced this pain for the first time when she was six years old and looked into a garden. The world appeared to her so beautiful that she wanted to take it in as a whole. She would like to die but is afraid to kill herself because she may kill others in the act of killing. In early recollections, blood poisoning of her brother who is two years younger, plays an important part. She feels that this was caused by her and that she had scratched the arm of her brother. She feels that she was mistreated by her mother in her early childhood. There was a strong affection for the father who died of general paresis when she was 12 years old. She was an extremely lively, active and outgoing child. At the age of 12, one of her teachers obviously seduced by her tried to make love to her, however there was merely petting. Her strong sex wishes are only incompletely satisfied by the husband. Her extramarital experiences were few and disturbed by repressions. She is extremely gifted as a writer and is full of activity if not too much hemmed in by her obsessions.

The physical examination was negative. However, her motility is exaggerated. She is continually in movement, doesn't sit still for a minute and is afraid that with every movement she may have kicked something or may have spilled poisons.

The therapeutic result of a therapy which showed the connection of her impulses and drives with her motility was very satisfactory and the obsessions came more and more into the background without disappearing completely.

Her brother who is two years younger shows an excessive sex urge and an excessive potency. He lives his sex urges out without any inhibition. He is an extremely severe alcoholic and was analyzed for more than three years in Germany with no therapeutic results. He has a slight diabetes. He was under observation in Bellevue Hospital and was only seen for a short time.

The history makes it at least probable that we deal with an impulse disturbance in the sense of hyperactivity based on organic factors. The possibility cannot be denied that the brother's and sister's sex urges may be increased too. The repression of these urges by Ruth may be a contributing factor in the structure of her obsessional neurosis. It is interesting that the symptomatology of this case is specifically based on motor impulses which find their psychic fulfillment by contracting the space and bringing the objects which are merely in sight in the reach of her immediate action.

CASE IV.—Marvin B., 12 years old, suffered from obsessions for more than two years. A letter had arrived from the sister of his mother inviting them to Europe. He pictured Europe vividly, thought how nice it would be to play with other children there and finally could not get rid of this thought. He was so bothered by this continuous desire that he hit himself four times on the left arm, telling himself that he would die if he would continue to think of Europe. An obsessional fear of death set in. He had to hit himself four times on the shin bone with his leg before crossing the street because he thought he might get killed otherwise. When walking on the street he felt an extreme pain when he was by chance touched by passers by. He was afraid that they might wish his death and infect him by their touch. The patient had a severe infection of his arm one year after his obsession had started. When he asked questions he had to repeat them four times. Four is an even number which has something restful about it. Three has something unfinished about it according to his opinion.

There are no organic signs.

Psychoanalysis, which was partially conducted in the group, showed that he had always been an aggressive and violent child who was often hit by father and mother. At six or seven he stole repeatedly and was severely punished. At the age of five he played with other boys on the street and tortured cats, tying them, pressing their muzzles together, pinching them, and pulling their tails. However, he protested when another boy was treated in a similar way by his friends. During the night he had often nightmares that an enormous cat was sitting on his chest. When such happened he went into the bed of his mother. He likes to fight with his older sister. When she made him angry he felt like killing her and wished her death. He acted similarly to his friends with whom he still likes to wrestle. When he wrestles with them he is not afraid to be touched, has no pain and no fears of infection and death. He started to masturbate before 10 and just before the outbreak of the obsession neurosis he felt that he might harm himself and tried to stop masturbation without success. He is particularly afraid that the loss of semen which occurred lately during masturbation might do him irreparable harm. There is at the present time a strong sex curiosity and sex urge.

After three months of treatment, the patient is completely free of symptoms, however, the treatment is continued.

The parents are obviously of an aggressive type. The mother has been so during several interviews. A five year older brother has been in the hospital with the diagnosis of schizophrenia. He is at the present time under treatment. He started around his 12th year with a complicated obsessional picture in which obsessional thoughts about vampires were paramount. At the present time he complains about a vibrating sensation near to his heart which reacts especially to noises. The observation is far from being finished. I am at the present time more inclined to believe that one deals with a complicated obsession neurosis. The face of the patient is decidedly rigid. There are no other neurological signs.

Also in this case violent aggression is in the foreground. There is a tendency to actions and to repetitions in which the number 4 and the counting plays an important part. Aggression and fear of infection go hand in hand. The child is lively and very active. I am also in this case inclined to believe that one deals with an organic motor factor. It is remarkable that obsessional features are also present in the brother, although the aggressiveness of the brother expresses itself in fantastic fears and preoccupations.

In a short paper dealing with the psychoanalysis of geometry, arithmetic and physics, I reported two cases of obsession neurosis which do not show any organic signs but show a particular relation to numbers and react to symmetry and asymmetry and to specific numbers with actions which restore the symmetry or remove the danger by motor actions which are repeated five times. I came to the conclusion that obsessional counting and counting in general is an action of an aggressive type. Counting and dividing into parts have a very close relation. To divide into parts means tearing and destruction. Activity and aggression combine very often with oral and anal tendencies. The relation to genital tendencies is not as close. The aggression is obviously not merely derived from oral and anal tendencies. It serves the orientation and self assertion in the world. The intake of food (and its excretion) and the erotism connected with it is merely a part of the self preservation and of the adaptation to the world. Whereas numbers serve as preliminary points of orientation in an almost amorphous world, geometry comes to life in other compulsions. Symmetry and asymmetry in the surroundings provoke, as is well known, changes in the posture and attitude of the individual. Asymmetry is a definite threat and threat to the body, acts on the inner organs and sensations and on the sexual functions. Symmetry and balance are motor phenomena

which ask for definite moral attitudes which express themselves in the muscular system (ego) but influence also the intestinal system (libido). There is no doubt that counting, the reaction to symmetry, asymmetry and gravity belong to the fundamental functions of the ego. The functions of the ego are connected with activity and aggressiveness. They do not serve only the maintenance of the equilibrium, the defense against hostile attacks and the possessiveness but also oral and genital tendencies.

I am inclined to believe that in many cases of obsession neurosis, organic factors are at work which influence these fundamental functions of the ego. In a great number of cases a direct proof can be produced that the impulse disturbances are in connection with organic changes in the brain. In other cases, probabilities can be offered. It can be shown that the organic impulse disturbances lead to a specific compulsive symptomatology. The inference may be drawn that in cases which show an identical structure of compulsions are based on motor impulses of the same type. We have reason to believe that there are cases in which psychogenetic factors as commonly defined are at the basis of the impulse disturbance.

I come, therefore, to the conclusion that there exists a group of obsession neurosis cases in which the motor impulses are disturbed. Compulsions are in the foreground of these cases. There is repetition, counting, and a special relation to symmetry and asymmetry. There is a distortion of space. Only Erwin Straus has so far drawn the attention to the space disturbances in the symptomatology of obsession neurosis. I want to be more specific in so far as I endeavor to elucidate the relation of space, geometry, arithmetic and physics to a specific organic apparatus. I want to emphasize that these remarks point to a specific group of compulsions. Obsessional neuroses exist in which such mechanisms are not present. From a psychoanalytic point of view, it has to be emphasized that one deals primarily with changes in the ego functions. These ego function disturbances are in intricate relation to libidinous structures. The details of this problem cannot be discussed in the frame of this clinical paper. Wexberg has also, starting from the experiences of encephalitis cases, come to the conclusion of an organic nucleus in obsession neurosis. I point to a more specific mechanism of a specific group. There may be other organic mechanisms in obsession neurosis cases. Goldstein remarks that there is a symptomatic simi-

larity between the basic tendencies of the obsession neurosis and a striopallidar case which he has observed. He sees the common factor in a tendency to persistence. Our observations do not substantiate this mechanism.

However, I do not think that the organic factor found in the group of obsession neurosis cases described is the only factor which can be observed in obsession neurosis cases. In many obsession neurosis cases, the state of consciousness changes when the obsession occurs. The pictures which represent the obsession become plastic and exceptionally clear. I once heard Dr. Kauders characterize this state of the obsession neurotic case very aptly as visionary state. Such was the case in one of our observations which Dr. Curran has used in a paper on bromide intoxications. This patient, an elderly Italian lady, was forced to think continually of the sex parts of her daughters on whom she wanted to perform cunnilingus. The patient finally took on her own counsel a great amount of bromides and developed a bromide psychosis, in which there was deep clouding of the consciousness. She heard voices and saw her daughters killed. With the disappearance of the bromide psychosis, the obsessions had disappeared completely, and the patient remained well in the subsequent observation of several months. We shall need patient observation and a collection of large material before we can appreciate whether we deal in such cases with organic factors regulating the state of consciousness.

It is difficult to appreciate the number of obsession neurosis cases in which organic motor factors are of importance. Preliminary impressions let me believe that organic signs can be found in about one-third of the cases. In another third the symptomatology arouses the suspicion of an organic background, and in the last third of the cases merely psychogenetic factors as commonly defined are of importance. This statement does not pertain to the general question of the constitution of the obsession neurotic case but merely to definite neurological mechanisms. In the majority of our positive cases we do not deal with sequelae of epidemic encephalitis but with organic changes similar to those observed in encephalitis but of different origin. They may be constitutional or they may be due to lesions in the fetal life, to birth traumas or to toxic and infectious processes of unknown origin.

It is worthwhile mentioning that with the exception of Case 1, satisfactory therapeutic results were obtained, when the patient was either taught in individual analysis or in group psychotherapy which the connections were between his motor drives, his compulsions and his libidinous structure.

Summary.

1. Seven cases of obsession neurosis are presented in which definite organic signs were disclosed by neurological examination. These signs remind of symptoms observed in epidemic encephalitis. However, it is not probable that one deals in these cases with mild encephalitis, of the epidemic type. They may be due to constitutional factors and to early traumatic toxic and infectious processes.

2. In two cases, the type of motility and activity hinted to similar organic factors. In other cases, the psychic symptomatology pointed to an underlying motor impulse disturbance.

3. Compulsion neurosis cases of this type show a particular relation to numbers and counting. There is the tendency to iteration and compulsions based upon it. The attitude towards space is changed. The motor drives are in close relation to sadistic attitudes.

4. Similar disturbances and a similar psychic symptomatology are present in the obsessions and compulsions observed in post encephalitic cases in which the organic change in the motor impulses is obvious.

5. Organic factors influencing the state of consciousness may have an influence in some obsession neurotic cases.

6. Psychotherapy has to consider the importance of the motor factors in compulsions and their relations to sadistic attitudes. They have to be appreciated in connection with the libidinous situation. In the majority of the cases treated, good results were obtained.

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DISCUSSION.

DR. HAROLD F. CORSON (Stockbridge, Mass.).—Dr. Schilder brings to our attention a group of cases which are notable because of the presence of both an encephalitic condition and an obsessional compulsive state. He states that although infantile experiences and situations have created a pattern, it finds its expression in compulsions on the basis of the organic processes involved.

The cases presented show evidence that has been interpreted as indication of an encephalitis residual.

The thesis, as I understand it, is that a very definite group of the obsessive-compulsive states has as an important etiological factor certain basic lesions associated with encephalitis. The nature of these lesions is not indicated nor are they differentiated from those that produce any of the infinite variety of mental or emotional changes that may simulate almost any form of psychoses or neuroses.

The various epidemics of encephalitis and the various forms of encephalitis have had a varied mortality and the sequelæ have been somewhat different at times. There are several outstanding groups of cases resulting from the epidemic encephalitis, such as the Parkinsonian type, the choreo-athetosis syndrome and the so-called Apache children whose conduct is so manifestly antisocial. The literature is not lacking in reports of schizophrenic reactions, delirium-like states, Korsakoff's syndromes, paranoid psychoses and depressive states with marked suicidal tendencies associated with the after-results of epidemic encephalitis.

These heterogeneous types of reactions would appear to depend not only on a variety of lesions, either in location or extent, but also on the different individualities of the persons affected.

It has been often observed that when this region of the brain is subject of a pathological lesion the attempt to correlate the lesion with disturbances of function is especially difficult. For one thing the lesions are apt to be multiple or diffuse, or both. The question as to whether we deal with the positive or negative effect must be considered. The time relationship between the lesion and the symptomatology should be of significance.

The possibility that these cases would respond in some way to symptomatic drug treatment such as atropine, stramonium, hyoscine or scopolamine, might be a point for discussion.

The significance of the excellent results reported in these very difficult cases is not clear and the question may be raised as to the possible factors—for example, does a chronic infectious process finally burn itself out? A second factor may be that the patient through treatment learns the most proficient use of an injured central nervous system and is able to make an adjustment by accepting the limitations thus imposed.

It is evident though a constitutional or organic factor is postulated in a large number of the obsessive compulsive states, that Dr. Schilder does not join this with any therapeutic nihilism, but rather the reverse. In calling our attention to the means of detecting the less evident signs of encephalitis, there should result a growth in the number of cases available for study.

The psychoanalytical formulation of the psychological factors will not be especially commented on. A psychobiological organization of the material might well throw into better perspective a number of factors that are overshadowed by the emphasis on the psychosexual. From the description and dynamic point of view, the cases appear to be absolutely typical of the obsessive-compulsive state. In short, the organic process does not appear to have modified or distorted the reaction type.

It also appears to follow that if an organic lesion either dams up energy, releases it without the usual brakes, or if it escapes through unusual channels, either the individual or the community is presented with a problem which can be met in a variety of ways. The Apache or antisocial child who has suffered from epidemic encephalitis finds himself in conflict with his community which is apt to treat him with increasing hostility. That inner conflict in the form of obsessive-compulsive states should result in some instances seems well substantiated in the most interesting group of cases presented by Dr. Schilder.

DR. ERWIN WEXBERG (New Orleans, La.).—I was particularly interested by Dr. Schilder's excellent paper, particularly because about ten years ago I made similar statements in a paper about the basic disturbance in compulsory neurosis in Germany. I have not very much to add as a criticism, but some points which Dr. Schilder certainly knows and which he might as well have mentioned as a support of these ideas.

First is the well known relation between compulsory systems and tic. The tic neurosis is not definitely separated from compulsory neurosis at all and there are definite forms of compulsory neurosis in which compulsory movements can be considered as well as tic movements, and other cases of definite tic neurosis in which the tic seems primary, to be merely a neurological condition, seems to assume a certain psychological meaning so that it slightly turns towards the compulsory movements. I remember a case in which the relation between the tic neurosis and compulsory ideas was in some way familiar, the case of a severe compulsory neurotic whose father had suffered from tic for a long time.

Another point which I made in that first paper on this subject was the relation which seems to me to be rather interesting between compulsory neurosis and stuttering. In some way stuttering seems to be related to compulsory neurosis, and particularly the factor of reiteration, of repetition compulsion which is obvious in the cases of stuttering. I wouldn't claim, therefore, that every stammerer or stutterer would be a compulsory neurotic, but there seems to be some relation.

A slight criticism I would make on this point: Dr. Schilder believes that the motor fact behind compulsory neurosis is to be defined merely as release or tremendous increase of impulses. I don't believe such a quantitative definition will do. I rather believe, as I stated ten years ago, there must be something basically wrong in what might be called the rhythmical function, the higher rhythmical coordination of motor factor, of motor function, which is essential for every motor activity in general. It is a higher function which, for instance, has something to do with building up and finishing a certain coordinated activity, not a movement but an activity.

I refer, for instance, to those cases of obsessional neurosis or compulsory neurosis who are unable to finish something. The case described at that time in my paper was a man who was entirely unable to go to sleep at night. It took him until three, four, even five o'clock in the morning, and once he was unable to go to sleep until nine-thirty in the morning. This came on time

and again. It seems to me to be some kind of inability or insufficiency of psychomotor rhythm. This is to be seen in the unjustified repetition, reiteration and perseveration present in practically all cases of compulsion neurosis, particularly the fact that they cannot get away from some point, some idea, and that they stick to it and cannot go on.

Another point which I want to make finally is the following: I think it is well known that compulsory neurosis is rather frequently combined with a state of mental deficiency. Of course this applies to the small minority of cases; but in a comparative survey you will find that whereas neuroses of other kinds are rather rare in cases mentally deficient, compulsory symptoms combined with mental deficiency occur rather often.

Another support for the idea which has been brought forward by Dr. Schilder is that there is some organic background in a certain group of compulsory neuroses.

I wanted to refer also to the feature of aggression, which is obvious in practically every case of compulsory neurosis. It may be in some way described as negativism, such as is particularly obvious in those not very frequent cases in which compulsory symptoms start very early in life, and are mostly referred to such motor functions as bowel movement. In this way the whole complex is related to the Freudian conception of anal erotism. So I would question the libidinous character of the whole mechanism.

DR. PAUL SCHILDER.—I want to make only one point clear. I have observed, as others, obsession neurotic features in cases which are from a clinical point of view epidemic encephalitis cases; but the main group in which I was interested are cases in which with the ordinary neurological examination, the neurological findings might have been neglected. I would furthermore like to say that in these cases the process is not known. The evidence speaks very much against an epidemic encephalitis. It is either something on the constitutional basis or it is some unknown process acquired probably before birth.

About Dr. Corson's remarks, for which I am grateful, I want only to say that the treatment in these cases, which are the main group of my discussion, is a psychological treatment but it is a psychological treatment which with the help of psychoanalytic methods tries also to show to the patient the motor nucleus in his aggressiveness, and this method has proved to be successful, as far as I can judge.

As to Dr. Wexberg's remarks, I can perfectly agree with him, and his two interesting studies on this subject were known to me. I was particularly interested to point to objective neurological findings in these cases. It was furthermore particularly interesting to show in detail how a specific symptomatology concerning space, symmetry, asymmetry, accounting and geometry, is connected with motor impulses. Of course, what has been discussed is in no way the whole psychopathology of obsessional neurosis but only one small part. I am, of course, completely in agreement with Dr. Wexberg that we shall need very many more studies on the organic problems involved in these cases and in other cases, too. In this group the factors seem to be particularly obvious.

THE PSYCHOANALYTIC CLARIFICATION OF PERSONALITY TYPES.*

By ERNEST E. HADLEY, M. D., Washington, D. C.

Throughout the ages man in his pursuit of security has always, at least vaguely, recognized the crucial importance of his relations with other people. People have been the most complicated entities with which he has had to deal. At the same time, they have been an ever present source of highly significant phenomena which he has had to strive to anticipate or predict. In keeping with a fundamental trait of the mind the tendency at all times has been to lump individuals into general classes or types. This practical typology is inevitable and but a particular manifestation of our tendency to generalize from the concrete instances that capture our attention.

The physician in particular is called upon to form useful classifications of the phenomena connected with his patients. Medical diagnosis amounts to such a procedure. Psychiatric diagnosis from this standpoint is the generalization of useful classes or types of phenomena, but unhappily generalizations from very complex fields of data. The diagnosis of personality—generalizations about what sort of person the subject individual actually is—became a central preoccupation of psychiatrists when psychiatric thinking developed to the point at which mental disorder was seen to be deviation of living having great extension in time. In other words, our realization that the phenomena of particular mental disorders arose out of or evolved from previous events turned our attention to the previous history of the patient and made it important that we make sense of the various ways of living that occur among more or less average people. Many other influences have focussed the minds of men on the building of typologies; our present purpose restricts us, however, to what may be called genetic psychiatry.

With the dissemination of Professor Freud's extremely fruitful insights into personality processes there came about a reorientation of psychiatric diagnostic thinking and our leaders swung more

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and more to the consideration of the person and his relations as a whole—the standpoint so industriously emphasized, *e. g.*, the past 35 years by William Alanson White. From an indefinitely extensive group of static types, we proceeded at first to a diffuseness in which the boundaries of our generalizations grew more and more foggy and thinking about universal human nature threatened to submerge all useful clarity. Everything, for example in certain fields of personality processes, seemed to manifest the ubiquitous Œdipus complex. Along this line, the classifying bent of the mind then expressed itself in formulating everyone in a typology of stages of manifestation or resolution of the Œdipus complex. We in America have been fortunate in that many of our psychoanalytic theorists have had extensive psychiatric experience with all that it entails in the way of practical problems and restrained optimism about abstract systems. Prolonged contact with large numbers of psychotic individuals impresses one with the probable justification of diagnostic typologies and personality types, but it also maintains one's perspective as to the multiple factors that make up the person.

Let me close my introductory remarks with a quotation from "Twentieth Century Psychiatry," the last published book of our late beloved Professor. "Perhaps the most important contribution to the understanding and meaning of psychological symptomatology will come as a result of the contribution that psychoanalysis is able to make by way of character analysis and its resulting significance for the further elaboration of the whole subject of typology."

Time precludes any historic survey of personality typology as it has preoccupied thinkers in the western world.[1] Some apparent continuities can be detected from the days of the Hippocratic formulation of *sanguine, phlegmatic, choleric* and *melancholic* types of people. Classifications have often provided many more than four rubrics; on the other hand, there have been reductions to as few as two fundamental types of people. You will remember Professor William James establishing the bipartite division into the *tough-minded,* who are rationalistic; abstractistic; intellectualistic; idealistic; optimistic; monistic; free-willistic and dogmatic,

[1] See in this connection *The Psychology of Character, With a Survey of Temperament* by Dr. A. A. Roback. New York. Harcourt, Brace and Company. Second edition, revised (1928) and reprinted (1931).

and the *tender-minded,* who are empiricistic, concretistic; sensationalistic; materialistic; pessimistic; pluralistic; faltalistic and skeptic. This is a classification of more or less definable traits of the mind concerned. A consideration of imaginal processes similarly carried Jaensch to the bipartite *eidetic* and *non-eidetic* classification.[2] The gnostic philosophers occupied themselves with a typology that took origin in the character of experience which was outstanding in the person. They saw people as *thinking, feeling,* and *sensational* types, Jung[3] found this approach satisfactory to him and added a fourth type, the *intuitional.* I need not remind you that his interest in this field had previously led him to a bipartite division of people in accordance with the manifest direction of their libidinal movement. This now celebrated extravert-introvert grouping proved shortly to be relatively unilluminating. His fourfold classification was then evolved and used to supplement the extravert-introvert classification—with difficulties some notion of which may be gathered if one considers the additional complication of conscious and unconscious modalities.[4]

Freud himself has been preoccupied with a system of distinctions among personality organizations. In "Libidinal Types"[5] he remarks that whoever undertakes "the justifiable task of differentiating separate types. . . . . [is] free to select the distinguishing characteristics and principles which shall determine this classification." "Physical characteristics would no doubt serve this purpose quite as well as mental ones; the most valuable distinctions would be those promising a regular association of physical and mental characteristics." A classification of personality types should be "recognizable in every day experience and should serve as a tool in clarifying our observations." For this purpose he distinguished "three main libidinal types, each according to the predominance of the investment of libido in the provinces of the mental apparatus,"

[2] Jaensch, E. R.: Eidetic Imagery: Translated from the Second edition by Oscar Oeser. London, Kegan Paul, Trench, Trubner and Co., Ltd., 1930.

[3] Jung, C. G., Psychological Types: Translated by H. Godwin Baynes. New York. Harcourt, Brace and Co., Inc., 1923.

[4] See also in this connection *The Re-Creating of the Individual* by Beatrice M. Hinkle. Harcourt, Brace and Co., Inc. New York, 1923.

[5] Freud, Sigm.: Libidinal Types; Psychoanalytic Quarterly, I; 1 pp. 3-6, 1932.

the *erotic*, the *narcissistic*, and the *compulsive* types. One would also expect to observe mixed types; viz., *erotic-compulsive*, *erotic-narcissistic* and *narcissistic-compulsive* personalities. The ideal norm would be the well integrated *erotic-compulsive-narcissistic* personality. Freud's earlier writings had implied a division of people on the basis of the evolution of personality along the line of a more or less healthy *genital* type or one or another of types of pregenital organization.

Karl Abraham [6] made the most elaborate of the psychoanalytic attempts at systematization and evolved a division of people into an *early oral-erotic* and a *later oral-sadistic* type. He conceived persons with the unrepressed form of early oral eroticism as continuing to find oral gratification in a variety of ways throughout all stages of their development and often experiencing its "reinforcement at certain times and in particular circumstances." These persons are receptive, communicative, bright and sociable. Ambition, acquisitiveness, inquisitiveness, generosity, and the like, are the traits of the healthy oral character, while the corresponding neurotic oral traits include morbid desire for food, avarice, impatience, restlessness, clinging or leech-like attitudes, and morbid perseverance. Reaction against the oral impulses may appear as an inhibition of the craving for objects with indifference to the need to earn (acquire) a living. Neurotic parsimony, apprehension of loss and pessimistic, and melancholic seriousness may result. These people will quite generally renounce personal success if they can obtain an assurred regular income. They have a pathological need to communicate. The later oral-sadistic or cannabalistic phase is marked by malicious biting, attacking and devouring attitudes. Moods of hostility and dislike are persistent and they are envious, covetous, jealous people.

Ernest Jones [7] first focussed his attention on characterizing the anal type of person who stood out roughly as *advantageous* because of his competency, determination, generosity, orderliness, patience, power of organization, reliability, and thoroughness; and *disadvantageous* because of his hypochondria, irritability, miserliness, obstinacy and tyrannizing proclivities.

[6] Abraham, Karl: Selected Papers of. Translated by Douglas Bryan and Alix Strachey, Hogarth Press, 1927.

[7] Jones, Ernest: Papers on Psycho-Analysis. Third edition, London, 1923.

In "The Oral Complex" [8] Sullivan laid the groundwork for the development of a typology which places emphasis neither on characteristics of the person as a unit nor on any part aspect such as the mind or the experience of the person, considered discretely, but rather on the interpersonal relations in which or through which the personality manifests itself. Personality to Sullivan is an hypothesis; interpersonal action is the observable phenomenon that can be subjected to classificatory thought. Many of the inherent incongruities and artificial simplifications of the earlier psychoanalytic attempts disappear with this shift of orientation. The consideration of types defined in terms of epochs of the person becomes fully meaningful; as for example, when we think of a juvenile personality as the kind of person who principally manifests with other people the sorts of interpersonal processes that are characteristic of social situations among juveniles.

In the developmental schematization we have *infancy,* a period that ends with the development of verbal behavior. Typical interpersonal activity at this stage is relatively undifferentiated appeal for the supplying of one's needs by environing persons with no very striking evidence of reciprocal action. *Childhood* is terminated by the appearance of activity bearing on other individuals who are of relatively contemporary development—other young playmates. The activity of typical childhood personality is more differentiated than was the case in the epoch of infancy. Much more action is directed to giving satisfaction to the expressed needs of the adult environment. Many processes appear that represent the inhibition of more simple self-seeking and the elaboration of effective idealizations of other people. In other words, the child may be assumed to have developed fairly good identifications with the significant adults and, where empathy was the outstanding channel of emotional interchange in infancy, we now see sympathy and more or less well developed hostility characterizing many of the interpersonal relations that include the child and his parents. Speech behavior often becomes the most conspicuous manifestation of the person during this epoch. Verbal processes of a simple and direct character and verbal processes which are really very intricate magi-

[8] Sullivan, Harry Stack: The Oral Complex. The Psychoanal. Rev. XII: pp. 31-38, January, 1925.

cal performances tend usually to be blended without any particular discrimination other than that based on utility in bringing about satisfactory relationships. There follows the *juvenile* era terminated by the appearance of what Sullivan has called the *need for intimacy*. The outstanding characteristic of the era might be said to be the development of cooperative and competitive activity and corresponding attitudes. Verbal actions and compliant and thwarting actions are both greatly enriched in the healthier developments through the juvenile era. The more magical verbal actions of one juvenile—adapted to interpersonal integration with his parent—is apt to collide seriously with parallel magical operations by the other juveniles. As a result of their ineffectual character outside of the family group, the magical verbal gestures tend to be inhibited or concealed in keeping with the provisions of the local culture. In other words, juvenile society is severely realistic excepting for the limitations imposed by the traditions, customs, conventions, etc., of the community. Participation in a school social group is rather general among us and there are very few who do not learn something of give-and-take in it.

The era of preadolescence begins with the maturation of the bodily reactive systems to the point at which one's satisfactions are greatly enhanced by the concomitant satisfactions of some particular other person. In our culture—and probably over the whole world—the other person who comes thus to share directly in the pursuit of satisfactions is much more like one's self than otherwise. Collaboration which begins thus is too complicated an integration to stand from the beginning for any such additional difficulties as the adjustment of one's behavior to a type of person with whom one has profound fundamental differences. In other words, the boy has not acquired very practical idealizations of the girl as a fellow being, shows poor address of his actions toward her, and thus finds every facilitation for what has often been called the "homosexual" phase of adolescence. I am inclined to think that a good deal of misunderstanding is inextricably associated with this term "homosexual." Our authority [9] has in this connection coined the word *isophilia* with which to indicate the peculiarity of interpersonal intimacy as it manifests in this period

[9] Sullivan, Harry Stack.

of development. In any case, the preadolescent two-group and three-group derives much greater satisfaction from acting as a group pursuing mutual objectives, than do the individual members in more self-centered actions. The basis for personal collaboration thus comes into being and the preadolescent experience in this connection tends to fix limits that are manifested throughout the later years. The era ends with the maturation of the genital apparatus and the appearance of the more adult type of orgiastic process.

The completion of puberty, I have said, marks the end of preadolescence and ushers in adolescence. This statement applies in our culture; it is quite possible that the culture rather than any inherent characteristic of human personality is solely responsible for this particular landmark. Cultural anthropologists have documented extensively social patterns here and there over the world which seem to imply that the transition from personal satisfaction in isophilic to heterosexual types of action may appear much later and be evolved much less conspicuously than is the case among us. Be that as it may, sooner or later after puberty, interpersonal activity directed towards members of the other sex becomes extraordinarily distinguished as a source of satisfaction. The development of increasing nicety and effectiveness in such action precedes throughout the period along with efforts to conform to preferred patterns of adult behavior as they are available in the culture. If all of these developments have followed serially and adequately, there comes a time when the individual is well equipped with interpersonal techniques, receives adequate satisfaction from his dealing with others, and finds himself a "place" in the community that is satisfactory to him. We regard this as defining *adulthood* and see from here on the more or less prolonged differentiation and refinement of interpersonal relations with a spread of interest among other people or a deepening of interest in some particular people, or both. This in briefest outline is the description of characterizing interpersonal action classified on the basis of developmental epochs.

Any study of preadolescence shews us immediately that there are some striking contrasts between the individual preadolescents. As an example, there are a few who are shy, secretive, distant and withdrawn from easy social action. Quite frequently these, as I shall call them, detached preadolescents are also noticeably similar in body build. At this stage distinctly, and later classically, they

are the leptosomic or linear type described by Kretschmer,[10] Stockard,[11] and others. A more or less bipartite or tripartite classification of body build certainly has some relevance in describing people—even as it has very considerable statistical difficulties owing to the broad overlapping of the groups. The significance of the constitution typology seems to me both poorly established and rather exciting. We have secured a quantity of data which tends to segregate the detached types of personality out of the general population in each of the developmental eras. It has been suggested by biologists that the strikingly linear person has had a high thyroid rate from very early, perhaps from before birth. Parenthetically, the reverse, the low thyroid rate, in the *pyknic* or *lateral* type of person is sometimes indicated by definite hypothyroid symptoms. In a philosophical moment Sullivan suggested that we may ultimately demonstrate the coincidence of vigorous prenatal thyroid activity with an hostile attitude toward the fœtus on the part of the mother. I have accumulated considerable data through the cooperation of several pediatricians on the development of behavior in unwanted as contrasted with desired infants. The differences really stand out. They are of a magnitude which leave little room for doubt as to the infantile empathy and as to the far-reaching consequences of very early exposure to an hostile environment.

Indirectly or unconsciously expressed, hostility in the environing medium seems really more effective than is the undergoing of frank dislike or hatred.

Thus, for example, Mrs. G., who was anxious and depressed during the gestation period; who was troubled with thoughts that the baby might be deformed or stillborn, and, who, thereafter, was highly concerned about every detail of the infant's welfare, provided an inadequate—undoubtedly improper—milk supply to the end that the infant exhibited marked gastro-intestinal disorder, cried pathetically and slept poorly. When finally the lady (who fortunately for this illustration was under analytic observation) was brought dramatically to realize the antagonism lurking behind these symptoms and her consciously cultivated views to the contrary, the infant

[10] Kretschmer, Ernst: Physique and Character (Second Edition Revised with an Appendix by E. Miller; author of "Types of Mind and Body," etc.) Harcourt, Brace & Co., New York, 1936.

[11] Stockard, Charles R.: The Physical Basis of Personality. W. W. Norton & Co., Inc., New York, 1931.

profited from relief of its symptoms and gained rapidly on the mother's milk which obviously had improved both in quality and quantity.

Again, Mrs. D. complained that her infant of four months suffered badly from constipation. The history revealed that the mother preoccupied herself with hostile sentiment toward the husband whenever she came to rest for the infant feeding. She was advised that her emotional attitude might have some bearing upon the chronic constipation and she was asked to dwell upon her love for the infant, or, more exactly, the reciprocal satisfaction that she could obtain in the nursing relation. Shortly, with much surprise, the mother reported the success of this therapeutic measure.

The postnatal linkage of the mother and infant is extremely important. Mothers who have cooperated in determining the extent of the infantile empathy bring utterly convincing reports of how the infant reacts to the maternal mood from the very beginning of the relationship. Let me illustrate from a somewhat later stage in a relatively uncomplicated integration where the mother showed rather less than usually the inhibition of her awareness of interpersonal hostility, and had rather high ability to tolerate it, especially the hostility of her offspring.

The citation is taken from the transitional phase between infancy and childhood. Learning first to enunciate "daddy," infant L secured much satisfaction in saying "daddy" whenever in fact her mother attempted to have her say "mamma." The elfishly wrong response evoked gales of laughter in which the mother participated, the reaction continued with mutual accord, there was neither irritation on the part of the mother at the refusal to say "mamma" nor insecurity on the part of the infant because of any threat to its security. With this single exception, the development of language techniques continued satisfactorily. At the end of an unusually tiring day, the mother came to discover L pleasantly employed in smearing excreta upon her person, her crib, her toys, and other available objects and began with unspoken criticism but unsmiling and seriously efficient mood rectifying the disorder which the child endured and observed with similar sobriety until the father appeared and removed with L to a less tense and more agreeable atmosphere. When the mother rejoined them, she remained in detached preoccupation with a book until the apprehensions of L became unbearable. At this point L ran to her mother, and cried out, saying "Mamma" for the first time. The mother relinquished her attitude spontaneously and received her child with those approving gestures which L had unerringly manipulated for the relief of her tensions of insecurity.

"Every person," says Sullivan, "develops from an adaptive state called infancy in which . . . . physico-chemical and biological needs appear and make their presence felt by concomitant increases of tension in muscular tissue. The satisfaction of these

needs is attended by reduction or abolition of these tensions and a withdrawal of alertness or vigilance from circumambient reality. Through life the pursuit of satisfaction is somatically a seeking to reduce or abolish some particular musclar tensions or heightenings of tonus. . . . . [Besides, the pursuit of satisfactions everyone is taught very early to need.] . . . . security, primarily a security from noxious emotional states empathized from the personal environment. The infant learns to seek personal security by reversing the pattern of seeking satisfactions. He is preserved from primitive insecurity by virtue of maintaining tensions in various of his muscle tissues." [12] He goes on to say that the seeking of security is throughout life a matter of tensing muscle groups and that the more acute one's insecurity becomes "the greater becomes the tonus in some muscular organs—often in the alimentary tract—unless or until panic (personality disorganization) ensues." He believes that these contrasting actions to get satisfactions or maintain security are profoundly significant for the theory of personality. "The character of experience had by almost all denizens of our culture includes a great body of forbidding gestures, the experiencing of which gestures inspires a feeling of personal insecurity" and a great deal of the developmental course of each personality is to be understood as directed toward avoiding these forbidding gestures and the unpleasant tension states to which they give rise. You will observe how this formulation connects with the idea of the detached personality as one who has from very early had to be cautious and alert to avoid hostile actions from environing persons.

With this very cursory glimpse at some of the considerations bearing on a scientific typology of developmental stages and the theory which seems to give it an explanation in terms that lend new meaning to many of the earlier psychoanalytic findings, let me go on to a redefinition of two of those types of personality that have been named from the disorders to which they are related. I have in mind, here, the obsessive and the schizoid. We are deeply interested in obsessive types of people because they represent remarkable difficulties for therapeutic approach, because they give rise to

[12] Sullivan, Harry Stack: "A Note on the Implications of Psychiatry, The Study of Interpersonal Relations for Investigations in the Social Sciences"; Am. Jr. Soc.; May, 1937.

peculiarly frustrating types of friction in the social fabric, or because they are peculiarly striking manifestations of the unprogressive forces in each civilization. We are deeply interested in the schizoid type of person because he sometimes progresses into schizophrenia, because he represents most mystifying problems to those who are associated with him, and because, despite the "distance" which surrounds him, he sometimes demonstrates the forces making for development and novelty in our civilization. I think that I can perhaps best complete my attempt at suggesting the current psychoanalytic contribution to personality diagnosis by sketchily indicating the developmental course of an hypothetical individual shewing each of these peculiarities.

Let us take infant O and have him born into a family the interpersonal action in which is strikingly hostile but mostly indirect expression of the destructive motives. We will have, for example, the mother a leader in the life of the community who married at conventional age a man of inferior station but superior intellectual gifts. Conforming closely to the tradition of polite society, and for reasons which we must seek in his childhood, the father is thoroughly opposed to quarreling, nagging, etc. For similarly distant reasons the mother deplores emotional display and has evolved a weak heart which is a great convenience in her domineering. We will now suppose that our infant O has been a somewhat unwelcome addition some five or six years after the last one of two desired children. I shall not repeat myself as to the infantile activity which will be a selection of the details mentioned above. In childhood we find O unusually careful to do and say the things which will suit the parents—remarkably enough, however, this nicely adjusted adaptation will include many events towards which the mother is critical, and the child comes increasingly to be engaged in avoiding her forbidding gestures. Some details always get themselves overlooked, however, and the mother finds diminishing satisfaction in the performances of the child. The siblings are sufficiently removed in time so that they are never confreres of our child O, who is in fact a burden to them. When child O becomes a juvenile we observe that he is peculiarly unpopular, again missing more or less subtly a great many opportunities for cooperation and successful competition with other juveniles. He shows a great deal of action obviously addressed to satisfying his school teachers and other adults but here likewise whatever favors he receives will be manifestations of toleration because of his mother's social position, and he himself will be thought of as rather a problem. When the "gang" age, or preadolescence, arrives, we find our O showing few evidences of any change in the character of his interpersonal actions. In adolescence, he will surprise us by having no obvious sexual or genital behavior. By now, as he personally appraises it, his life is nothing but a burden; he is the prey of innumerable "considerations." Every thing that he thinks is "over-

thought" to a remarkable degree; he does so much and such contradictory thinking about his pursuits of satisfaction that most of his satisfactions are secured without his awareness—when he is not looking, as it were. His pursuit of security, on the other hand, is a preoccupation patent alike to him and to others, and very annoying to the latter who find themselves figuratively entangled as if with fly paper, so that they can neither like nor detest O but only tolerate him unhappily. They suffer in their integrations with him; they are unable to blame him directly for their suffering; equally, they are unable to influence him into developing more pleasant activity. Like all the rest of us, he is full of the best possible intentions; it is simply amazing how much attention his intentions receive from him, and how little good it all does anyone. Our O has become an *obsessive* type of person. If he is subjected to great interpersonal pressure, he will develop a full blown obsessional neurosis. If not, he will remain successfully insulated from any awareness of the frequent manifestation of hostile tendencies that developed in him from his early misery, just as he must remain insulated from any real development of interpersonal intimacy. His life is devoted to warding off insecurities in large part the result of continued indirectly expressed destructive impulses, the whole being the manifestation of a person whose techniques for securing satisfactions are poorly developed and whose techniques for maintaining personal securities are chiefly directed toward people distorted into the pattern of his ineffectual and hateful parents and siblings.

Let us now sketch the developmental course of infant S, having him born as their first child into a family the interpersonal action of which is distinguished by the dominant mother's hatred and contempt for the father—who in turn manifests recurrent alcoholism, sexual promiscuity, and an annoying indifference to his wife's complaints. We shall have the mother the eldest daughter of a rather distinguished but hot-tempered scholar, who married on rather short acquaintance a particularly handsome cousin who visited one summer in the home of one of her schoolday chums. She will have found herself sexually frigid and in fact repelled by sexual intercourse. The pregnancy will have been somewhat stormy—one of the mother's treasured grievances, ultimately, of course by accident communicated to the son, is the occasion when her husband first came home intoxicated and insisted on having "his pleasure, although little S was only four months off." After this event, the mother had increasing disability related to the gestation, ending with severe perineal laceration which she never could bring herself to have repaired. Infant S is in some ways very well cared for. The mother, despite her ill health, insists on doing everything for him. As a child, he is the apple of her eye, already taught to distrust the father, and to avoid identification with any of his traits. He has learned that he "takes after" the mother's family, and feels very close to her, at times. He is intelligent and early learns to occupy himself when the mother is busy. In fact, he has developed a rather remarkable ability at fantastic satisfaction of the unfolding needs of his personality, coupled with a subtle avoidance of the mother's efforts to absorb him to her. He seldom offends or rebuffs

her, yet his inner life is chiefly unknown to her. He then goes to school, "falls in love" with his primary grade teacher, is one of the brightest boys in the class—and pays less than usual attention to the other children. We shall make him somewhat of the teacher's favorite and observe with some amazement his skill at avoiding the dislike of his classmates. We shall see him avoiding games and competitions in physical skill, and again note with uncertain affect his subtle actions to "save face" with the other boys, even the bullies. At home, we shall find him drawing chiefly unexpressed comparisons of his parents and those of whom he is hearing—with an increasing distance from his own, but with "building them up" to his classmates. We shall find him showing something akin to resignation in listening to his mother talk about him; he having discovered that "her son" has not too much in common with him, as he is appraising himself. In the later years of the juvenile era, we hear his companions refer to him in ways indicative of aloofness and unaggressive superiority, of suspected rather than demonstrable shyness and sensitivity, perhaps of moodiness, morose antagonism, certainly of strong dislikes and of shallow friendships. He may be liked by older boys and avoid all association with contemporaries; more ominously, he may associate only with boys younger than himself. It may be that he has always preferred girls; it may be that he has unusually strong dislike for them. In any case, he arrives in preadolescence and finds a chum. He may be too much a "goody" for the average boy, and rather surprisingly "wild" for some abnormally nice boy who cultivates him. But in any case, we shall give him a chum. And, we shall see remarkable benefits begin to flow from the intimacy, however mute he may be in showing affection, however taciturn he may be in general. Then the chum will pass on into adolescence, but our S will not. The preadolescent friendship perishes from maturation of the chum, and S suffers keenly from loneliness. Outwardly, he may make a fine showing of adolescent development, have "dates" and a "steady." On closer scrutiny, however, we see many evidences of specious adaptation. In particular, if we gain his confidence, we find that "his girl" as represented in his thought is astonishingly different from the actual young woman of whom he is thinking. His idealization is exuberant and firm in the face of many discrepancies with reality. When the latter force themselves upon him, he withdraws hostility—perhaps with an apparent increase in suspicious distrust of women; perhaps with the evolution of a rather sardonic derogatory "heart-breaker" technique. Ultimately, we may see our S as a distant, rather forbidding or "stand-offish" person, at apparent ease with a durable circle of friends, men and women—but not average women—judicious, helpful, perhaps foresightful almost to a fault, a powerful but rigidly self-dependent friend; in fine, a schizoid personality of the socially effectual sort. If he had received a severe wound to his always diminutive self-esteem in the latter stages of preadolescence; if he had suffered condign humiliation in his rather specious adolescent experimentations; he would in all probability have suffered schizophrenic dissociation, with paranoid or hebephrenic development, or recovery, as the case might be, on the basis

of his previous warp and the unfortunate or fortunate experiences that came to him in the period of the psychosis.

These two sketches have been composed to point the contributions that intensive psychoanalytic study of personality has made to the formulation and diagnosis of personality types—to the delineation of typical personalities. A few words in concluding discussion may point the distinction of the current from earlier attempts in this direction. We see in our obsessional and our schizoid personalities, as examples, not a congeries of discoverable traits of the persons before us, but observable, characteristically segregated, patterns of interpersonal action *with* us and with others, in turn the present stage of a developmental elaboration of all the significant interpersonal experience survived in earlier years. Our typical personalities manifest certain typical past experience and certain typical future probabilities so high that they are rather secure guides to therapeutic interpersonal actions. We grasp from our types both their origin and the methods of favorable influence, if they are in trouble. Again, to quote Dr. White: ". . . . different types [of people] are incapable of understanding each other. . . . . Two such individuals in their language use the same words but what each says is incomprehensible to the other. . . . ."[13] The psychiatrist must rise superior to these barriers to communication, if he is to function as therapeutist; and to that end there is much help in the envisagement of the dynamic interpersonal type of himself and of his patient, in so far as this typology implies the types of development that have culminated in the two people in action with each other.

[13] White, William A.: "Twentieth Century Psychiatry": New York, W. W. Norton & Co., 1936.

PSYCHOANALYTIC CONTRIBUTIONS TO THE CONCEPTION OF DISORDER TYPES.*

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With the passing of time and the accompanying broadening of human knowledge it has become increasingly difficult to regard any aspect of human personality as an entity in itself. The self has come to be regarded very generally as a product of interaction—one cannot know a man unless one knows his friends—his profession—his interests—his values, etc. It is well nigh impossible to regard personality except as the product of a biologic organism in interaction with its social world, its personæ dramatæ, its values, its demands, its opportunities and restrictions. This awareness of the person as a dynamic force must assume that no attribute of the person, no configuration within the total personality configuration can be meaningful without reference to that total configuration. Disease of any kind is but a process within a larger order. Mental disease cannot usefully be described as a clinical entity—cannot be sharply divided from the mental aspect of the person as a whole, in all phases.

To regard mental disease as a clinical entity is to assume a similarity to organic pathology. But what specific organic corollary for mental disorder has been found? Kraepelinian psychiatry with its emphasis on description and classification achieved a great advance in freeing the mentally sick from the accusations of theology and from therapeutic or punitive activities designed for dealing with spirits and witches. It performed a further temporary service, namely, it brought psychiatry into the scientific schema of organic medicine. No organ was found lodging a mental disorder constellation, but careful classification of symptoms developed conceptual types more or less easily applied to the task of diagnosis. This procedure followed closely that of organic medicine. The attempt was to plant the roots of mental disease in organic soil. But the material was elusive. Unlike the organization of symptoms and bacteriologic findings that in the field of medicine is

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labeled "scarlet fever," Kraepelinian psychiatric forms were difficult to find in pure state and clinical experience forced even the classificatory scheme to postulate "mixed" or "allied" forms to cover the facts of mental disorder. Moreover the effort to conceive of mental disease in terms of organic disease while producing an impression of medical orthodoxy, resulted in sterility of insight into the nature of these disorders. Mental and emotional states cannot be allocated to the brain when clinical evidence demonstrates repeatedly that they often involve the entire body. But even the body sets limits too narrow to encompass the etiology of affective states, for these are inextricably bound with other bodies. Personality is not a product of the biologic organism alone, but of that organism in interaction with others, and psychiatry is forced to enlarge its scope to include the individual's social setting as well as his body. The psychic organization of individuals is not a static thing—cannot profitably be conceived as fixed. We can only describe it in terms of instinctual, or perhaps better, biologic drives, wishes, attitudes, affects—social terms which force upon us the conclusion that "personality problems," "mental aberrations" can be understood only where seen in a large setting of associations and relationships extended in the long continuity in time.

This approach to disordered personalities in the field of medicine and specifically of psychiatry was introduced in the face of extreme opposition by Freud. His classification of personality and the mental ills to which it falls heir rests upon the assumption of processes referable to inter-personal relationships. Diagnosis based on these principles is essentially merely the designation of the most likely vantage point in the fluid personality configuration from which to observe the play of forces which is resulting in symptom formation or character disability. Therapy proceeds not with reference to the superficial picture but to an understanding of the development of the self as a whole. Referring to this development and its relation to mental disorder, Freud writes

> Neurosis is the result of a conflict between the ego and its id; psychosis is the analogous outcome of a similar disturbance in the relation between the ego and its environment or "outer world." Normally the outer world commands the ego in two ways; first, by current perceptions which it is constantly able to engender afresh, and secondly, by the store of memories of former perceptions which, as its "inner world," has become the possession

and a constituent part of the ego. Now in amentia, not only is acceptance denied to fresh perceptions, but the importance of the inner world—that world which formerly reflected the outer world as an image of it—is withdrawn too; the ego creates for itself a new outer and inner world constructed after the patterns of the impulses of the id (biologic drives). The motive of this collapse of the ego's relation with the outer world is a severe frustration of a wish by reality. There always remains a common feature in the etiology of both neuroses and psychoses—the factor of frustration—the lack of fulfillment of one of those uncontrollable childhood wishes that are so deeply rooted in our composition, phylogenetically fore-ordained as it is. We divide the causes of neurotic disease into those which the individual himself brings with him into life and those which life brings to him. It is the interaction of these that as a rule first gives rise to illness.*

The socio-philosophic theory behind this definition of mental disorder assumes that the nature of the self arises out of social interaction and comes to grief in conflict with its particular social world, actual or as it has been incorporated in the self. Unlike the Kraepelinian conception of psychiatry this approach goes beyond the limits of traditional medicine and demands of the psychiatrist that he be conversant with more inclusive aspects of his patients than the somatic organization. This step, which, on the one hand, freed psychiatry from the bondage of fixed, organic definitions, on the other hand, opened it to accusations of occultism and mysticism and less politely, of racketeerism. But it has also given the psychiatrist an understanding which has enabled him to do more for his patients than classify them and wait for spontaneous remissions. Although our knowledge is as yet sorely limited, we are able, daily, to look with new eyes upon ancient phenomena and see more deeply than we had seen before. The microscope paved the way for vastly improved techniques of diagnosis and therapy by revealing more truly the nature of disease. I should like to illustrate briefly some ways in which use of the psychoanalytic lens facilitates an understanding of the nature of mental disorder and suggests diagnoses which not only classify but offer some suggestions for the reconstruction of the disordered personality.

To a very large degree, the concept of mental diseases as clinical entities involves the consideration of an illness as something which has a specific onset, course and termination, all of which would be an anticipated and a more or less usual expression of a specific disease repeatedly encountered in clinical practice.

* Freud, Collected Papers, Volume II.

Ordinarily the understanding of a psychiatric case is in terms of a characterization of the predominant symptoms and of the external precipitating causes. One thesis of this paper is that an understanding of these reactions and of the importance of the precipitating causes is possible only when one takes into consideration the specific past experiences of the individual and of the vestiges of those experiences either conscious or unconscious. Precipitating experiences are of importance only when they fit into the particular conscious or unconscious conflicts of the individual concerned. In this connection we may refer to a man who developed a depression with the usual phenomena of indecision, crying spells, and somatic complaints. The depression was apparently precipitated by the strain of having to start a new business. However, the depression and the strain involved become intelligible only when we consider that this man had developed a particular inner conflict of the following sort: He was able to take on a new business or a new responsibility only when someone else had assumed initial responsibility so that if things did not go well he could lay the blame on his predecessors. Such a situation also provided an opportunity to show his superiority to a predecessor by carrying the venture further than the original person was capable of doing. This pattern started early in life in relationship to a brother two and a half years older who had been consistently denied privileges and opportunities which the mother readily bestowed on him and when the brother was permanently invalided by disease, the patient felt unconsciously that somehow his successful efforts to obtain more than the brother had resulted in permanent harm to him. In adult life the patient, using his original pattern, had been able to succeed conspicuously in business ventures which had been started by others. But just before the onset of his present depression he was called upon because of his success to initiate a business on his own. However this involved the assumption of too much responsibility, gave too little support for possible failure and produced too much guilt about taking the place of a predecessor or brother whose right it was, according to the patient's unconscious pattern, to have first honors. This small segment of the case is reported to demonstrate how important is an understanding of the life experience of an individual and the conscious and unconscious conflicts related to it in the interpretation of a disordered type because given another

life pattern the same event might not have produced the disorder at all or might have done so on the basis of quite other emotional forces.

From the dynamic point of view it should not be difficult to believe that an individual can show a variety of clinical reactions; manifest a far greater freedom than we would expect in the progression of phenomena in the field of organic diseases. For the most part, what we call clinical reactions are really methods of defense used by the patient to ward off anxiety connected with internal conflict. There is no reason why some people should not develop a number of techniques for defense against anxiety or develop new techniques when the old are no longer effective. In fact, most people do. We know, for example that some people defend themselves at one time by denying certain impulses in themselves, at another by projecting those impulses on to others and at still other times by resorting to somatic symptoms, etc. In a similar fashion we may see patients use first the isolation defense of the compulsive, then the self-aggrandizement and self-punishment defenses of the manic-depressive and finally the withdrawal defense of the schizophrenic. Psychiatrists do not need to be reminded how frequently purely manic excitements in adolescent patients, while they may be followed by a period of approximately normal mental health, show definite schizophrenic coloring in their next occurrence, and progress into unquestionable schizophrenia. The following case demonstrates a somewhat different progress:

A boy of 18 was brought to treatment due to extreme anxiety related to the delusion that a very disagreeable odor apparent to everyone near him emanated continually from his rectum. An aunt reported that in her presence, when the boy was three, he had awakened crying and had insisted to his mother that he smelled. Even after the mother bathed him and put him into clean clothes he persisted in crying "I smell, I smell."

About the age of eight the patient was ill and noticed an odor which he thought must be noticeable to others. He had been in almost constant fear of this and attempted to protect himself by withdrawing from social contacts with other boys and girls. Later he believed he actually saw people sniffing and coughing at him and he became more and more withdrawn and at the same time fearful, for he felt that people around him reacted with hostility. During the year before he was brought to treatment he felt further that in some way, this odor reached around the world, and caused acts of violence, such as murder, suicide and wars. Naturally people were extremely hostile toward him for this reason and he was in constant fear of their

antagonism. To relieve this intense anxiety, he resorted to what he called his "concentration method." As soon as he observed any hostile acts he would begin to repeat words and phrases and concentrated absorbedly on this repetition. The words were chosen at random and were repeated until the patient was exhausted. He complained of the fatigue of this method but he preferred *that* to his fears. Other methods of defense were to sniff or cough back at anyone who did so to him or to breathe deeply. Although these activities were so destructive to his social existence and made him irritable and moody, they did not prevent him from completing his high school course, from working in his father's store, or from starting business school. However, his delusion of hostility directed toward him, spread and involved more people more openly. His "concentration method" failed to allay his own anxiety, and his delusion of his personal power for destruction gradually encompassed everything he contacted. He finally became a nuisance to his environment, was placed in an institution where he became more and more catatonic and finally stuporous.

When we come to the matter of outcome it is interesting to note that here again we have a progression of phenomena quite comprehensible from the standpoint of the conception of disorder types as dynamic configurations rather than disease entities but one rather difficult to envisage from the viewpoint of organic disease. Patients during treatment sometimes develop reactions simulating psychotic episodes on which a diagnosis of some disease entity might be made, but which, in reality, are much more the individual expression of a new dynamic interplay within the personality. To state the fact more briefly: Apparently psychotic episodes may occur in individuals who do not have one of the psychoses as customarily conceived. When such episodes occur, for example, during a process of cure in which—as a new integration is developing, there is a temporary imbalance of the forces of the personality, they need not result in destruction, as might be imagined, but may have their place in an advance in the process of successful personality organization. Episodes of this nature are apparent in the following case:

The patient was a 30-year-old unmarried woman who complained of almost constant fatigue and tenseness and feelings of inadequacy which had been in evidence for over three years. Her symptoms, which were essentially a severely exaggerated version of lifelong symptoms, were precipitated (or exaggerated) by two events: (1) the death of her mother three years before and (2) the concomitant jilting by a man, who had taken her money, claiming to invest it, and had faded out of the picture with his person and her money.

Her life-story was largely that of the development of severe narcissistic and masochistic reactions to an unusually severe series of environmental traumatic situations. Of these traumata, we might mention the following: a younger brother died when she was one year old; a younger sister died when she was two years old; her mother repeatedly told her that she was an unwanted child and regarded her as a sort of poor substitute for another brother who had died six months before the patient's birth; her father forced her and her sisters to expose themselves genitally to him; he was later committed, as a paranoid psychotic, to a state hospital; her father enjoyed "saving money" by buying things at auction sales and for years as a child she had to wear women's shoes, because her father had bought many pairs of them at an auction and had then no money to buy children's shoes for her; when she was 19 a younger sister committed suicide when the father resumed his scopophilic activities. (In addition to those who died, the patient had one younger brother and four older brothers and sisters.)

In response to these situations, the patient developed intense sadistic and masochistic reactions, with the latter much more in the foreground, a life long conviction of inadequacy and emptiness, frequent self-accusations, persistent expectation of unhappiness and frustration, fatigue and headaches, expectation of pain and suffering in any interpersonal relationship, and a belief that she could never be happy except at the price of suffering before, during or after the happiness.

Yet, in spite of this attitude, there was a well adjusted set of reactions that led her to a high position in her profession and secured for her the respect and admiration of her fellow-workers.

In addition to the sado-masochistic reactions, she developed a severe narcissistic response to the repeated traumatic situations. She developed grandiose and omnipotent fantasies that persisted to such a degree and with such vividness that they reached almost to the point of delusional certainty. She fantasied, and she almost believed, that her hatreds were such that just the thought of hurting someone might seriously damage that person. She fantasied, and she almost believed, that her jealousy had caused the deaths of the siblings when she was one and two years old. Her religious ideas became deeply tinged with a feeling of magical power. At times she felt that she would die or be eternally unhappy unless God gave her a sign of his favor by having a game of solitaire "come out" correctly, and one time she played for 16 hours until the game did "come out."

During the early part of the treatment, she had a number of transient episodes which were mildly psychotic, but which led to an increased insight and integration. One time, as she had a vivid, almost hallucinatory, fantasy of taking a snake into her mouth, she went into a panic—lasting hours, accompanied by vomiting, diarrhœa and polyuria and with the belief that she had something in her that was destroying her. With a spontaneous insight into her desires to take her father's penis, the panic disappeared and her fatigue reaction to her father's presence diminished permanently. Another time, when she was warding off her awareness of her resentment to her

dead mother, she was in a sleeplike stupor for 16 hours, after which there was an increased ability to see that she had been identifying herself with her dead mother, and then for the first time she was able to feel some understanding of her mother's own problems, and to forgive her mother for having said that the patient was an unwanted child.

Another psychotic episode occurred when she suddenly developed the idea that she simply could not stand being a woman any longer, that it was too great a burden to bear. She rushed upstairs and for an hour, with no one in the house to watch the dramatics, she shrieked, tore at her hair and bumped herself against the walls. With the subsidence of this episode, she began to develop some insight into her overwhelming desire for a penis to make her perfect, to give her power, and to save her from the destruction involved in being a woman.

In this case we see apparently psychotic manifestations such as the patient's stupor and excitements actually serving to release forces formerly employed in preventing awareness of emotions and ultimately making possible an insight which permitted the patient to accept life experiences and the affects related to them and assimilate them into her present adult personality configuration—a configuration which, on a real level, had achieved very considerable success.

The effect upon clinical diagnosis of this interpretation of disorder patterns as dynamic resultants of forces which tend to organize into an approximation of a balance which—for a given individual, we call the normal personality, is to shift the emphasis from an effort to state what pathologic mental picture the patient most nearly represents to an attempt to diagnose or describe the fundamental structure of the patient's total personality. This accomplished, the disorder pattern becomes meaningful, by virtue of what one knows of the feelings and reactions of the patient before the onset of the disability. It is seen as a part of the patient's own psychobiologic configuration and not as an invasion of that organization by something foreign to it. If one can detect the development of the disorder pattern, detect the patient's original need for setting up the defenses which are the clinical reactions that brought him to treatment, one finds that one has the clue which should suggest effective therapy as well.

The contributions of psychoanalysis to the diagnosis of disorder types may appear, at first glance, to be decidedly negative. If one likes to pigeon-hole one's human problems, the less one knows

about the individual patient, the easier is the task. The data that come from intensive psychoanalytic study of most patients do not fit into the more classical psychiatric diagnostic schemes, and the inexperienced psychiatrist first hearing a psychoanalytic report of a patient, may feel that the patient shows symptoms of every disorder. In this initially disturbing thought there is a clear indication of the positive contribution of psychoanalysis. Freud's studies and the work that has followed their publication—perhaps especially the work that has been carried forward in America where psychoanalysts are trained in psychiatry—has "made sense" of psychiatric diagnosis, has removed it from the field of dubious abstractions to the realm of dynamic descriptions. Psychoanalysis has taught us to see in the symptom pictures of our patients, dramatic events that have arisen by understandable processes in the long stream of events that makes up the lives of our patients among the incidents of their environments.

THE PSYCHOLOGY OF THE SWINDLER.*

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The psychology of crime and criminals involves problems of extreme complexity. Considerations of a physical, intellectual (mental), emotional, moral and social nature are in order, viewed either from the standpoint of the individual's psychology or that of the social group. Of late, attention has been called to the advisability of studying the psychologic basis of social concepts, as ethical and unethical conduct, which are involved in crime.[1] This approach [2] regards man as a socially conditioned organism and focuses its interest on how the feelings of "good and bad," and "wrong and right," develop in human beings. Following Burrow's formulations which study the individual on the basis of his phyletic organismal development, this view regards the larger societal canvas as a fruitful one on which to study crime. Before, however, one can work with these socio-psychologic concepts much can and should be learned from detailed study of the psychodynamics of individual offenders. Intensive investigations, especially those of the psychoanalytic school,[3, 4, 5] have indicated the probable truth of the formulation that crime is the expression of a maladjustment based on deep (unconscious) mental conflicts. Such a view points to the need for further study of the personality of offenders.

In studying the personality reactions of individuals in a criminal population, it becomes clear that fixed descriptive appellations such as pathologic liar, psychopathic personality, moral imbecile, constitutional psychopathic inferiority [6, 7, 8] have a limited value. Such diagnoses may lead to the neglect of dynamic factors, conscious suppressions and unconscious repressions, substitutions and gratifications, that may be the effective causes of wrong-doing. What is observable behavior (crime) is the result of the clash between inner needs and social reality. Hence, a psychiatry that wishes to

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study crime should have as one objective, the individual and his emotional life, whether a psychoanalytic technique [4] or one more suited to clinic psychiatry [9, 10, 11] be employed.

I.

The present paper is a consideration of the psycho-dynamics of a group of 50 swindlers examined in the Psychiatric Clinic of the Court of General Sessions between 1933 and 1937. Included in this group are those implicated in confidence games, switch games, stock swindles, illegitimate real-estate promotions, swindlers who aim at women's savings through proposal of marriage, larcenies based on misrepresentation of business assets and issuance of false financial statements, larceny by trick, impersonation of officials or physicians (practicing medicine without a license) and so on. The individuals studied varied in their personality characteristics, depending upon their racial origins and cultural contacts. The criminologic and fictional literature pays considerable attention to these details, describing swindlers as well-groomed men of the world, superficially cultured, often adopting an attitude and air of nobility. Others have a foppish manner, a sense of fashionable dress and even an intimation of effeminacy in their toilette and dress. Still others affect the attire of the sporting world. All are intelligent, suave, glib individuals, well-met fellows, talkative and companionable. These characteristics constitute what one may call the surface picture of the swindler.

Textbooks of psychiatry have naturally described the more exaggerated types. In sections devoted to "psychopathic types," they depict the "born" swindlers, pathologic liars and severely hysterical characters. From the time of Pritchard (1835), who introduced the concept of moral imbecility, *i. e.,* moral perversion without intellectual disturbance, alienists have considered "hysterical" swindlers as belonging to the group of fixed psychopathic personalities. Excellent descriptions of the hysterical swindler are available, especially in the German literature. Kraepelin,[12] who wrote as clearly on morbid personalities as he did on psychoses, described the swindler as being an hysteric individual (fantastic liar) without an inner ethical sense. Bleuler [13] sees the swindler group as suffering "from an exaggerated activity of their phantasy with unsteadiness and

planlessness of will." Vanity, egotism, wishful thinking, he found, sweeps them into rôles which conflict with reality.

Psychologically we can separate the group of hysterical swindlers whose lies and misrepresentations are for their self-aggrandizement (impersonating an officer) from those who primarily are interested in money (confidence game). For the former, social position, gaudy uniforms, high-sounding titles, etc., represent the chief source of gratification. The psychologic mechanisms here are not particularly difficult to follow. Such persons lie habitually and fabricate their background, education and family connections in order to convince themselves and others of the reality of their fantasies. We have not been able to gather much subjective data to help in the understanding of the inner dynamics of these individuals. They are extremely protective, even becoming paranoid under questioning or examination in a supreme effort to protect their fantasies. For these types, being known as a physician or a nobleman is sufficient recompense; their gratification is that of living the part that they portray. It is perhaps because of the mixture of omnipotence and social position that the medical profession implies in the mass mind that it makes so great an appeal to these offenders. A case illustrating this may be briefly cited:

M. R. S., a man of 47, born in Switzerland, had been brought before the court on the charge of forging a check. This individual had a checkered career since before the war. Although his work record was spotty, he managed to hold many medical positions of trust in various parts of this country, until he inevitably became involved in trouble. His record included a conviction in Germany, three convictions in this country for practising medicine without a license, one of which occurred while he was employed as a physician in a department of New York City, an unwarranted position as psychologist in a Board of Education project, several sentences in the penitentiary for minor larcenies, and several admissions to Bellevue Psychiatric Hospital for hysterical episodes, one being an attempt at suicide by poison. He was a man of superior intelligence, with a considerable smattering of psychiatric and medical knowledge, of glib speech, suave manner and charm.

At the time of our examination he hid behind exaggerated and persistent lying about his background. Careful check of his activities since 1913 indicated that almost everything he did was under the cover of this inveterate lying. M. R. S. invented stories about his education at leading universities in Germany, his nationality, his war experiences (including several miraculous escapes, court martial for treason, etc.) and his medical education. At one time he claimed to be a psychiatrist and mixed freely at one of the psychiatric congresses, until he was discovered. All through the period of

examination and observation he showed marked instability, excitement and distinct paranoid tendencies when his record and accomplishments were questioned. After considerable psychotherapeutic work he admitted that all his claims to having been a physician were fraudulent and that the diplomas and papers he carried were forged. We were able to get him to see that his desire to be a physician was a compulsive, neurotic symptom, based on the tremendous drive to obtain social recognition.

In this highly unstable individual, continued pathological lying and desire to delude others represented an adolescent attempt to force himself to the front. It was probably further related to a strong identification with his father, who was a guard in a museum in Europe most of his life. The father apparently was a scholarly but uneducated man, and the offender, his son, projected and intensified the father's unachieved ambitions. Unable to face the realities of the situation he broke down into an hysterical outbreak or a paranoid formation at each frustration.

Here we see that the object of a lifetime of pathological lying and deception was not so much monetary gain as social achievement and high position. A medical career provided the psychic support which his ego demanded and the details of which his active fantasy supplied.

Bleuler,[13] Birnbaum,[14] Healy [15] and many others have emphasized the "pathological imagination," the self-elevating tendencies, the disregard of the thinness of their deception and the feeling of invincibility of these swindlers.

All these tendencies have been plainly seen in our cases, especially the feeling of infallibility which characterizes the swindler. No victim, they feel, can see through their machinations. All this is conceded to be due to the overwhelming egotism of the swindler, but there is another factor often overlooked which touches on a pivotal point in the psychology of the swindle relationship. Apparently this feeling of infallibility arises because the swindler feels confident of his ability to influence the victim's psychology. This is accomplished by dimming the judgment and reality-testing function of the victim. The swindler's business is to so stimulate the acquisitive tendencies and greed of the victim that conscience, logic and judgment are overwhelmed. The emotional rapport between victim and offender is utilized to serve this purpose. The philosophy expressed by many of our cases, that there is "larceny in everyone's heart," is a succinct expression of the psychologic substratum of the swindler's approach. This broad principle is at the bottom of so-called games of chance and "three-card monte" game. Here the

confederates among the crowd draw attention to the apparent stupidity of the player, often a Negro. The rush of hostile feeling toward the player is depended upon to prevent the victim from recognizing that he is being duped. This example furnishes a glimpse into the meaning of the swindle. The victim believes what the swindler tells him only because it coincides with his inner wishes. In common language, the swindler succeeds in "reading the mind" of the victim and in correctly interpreting his preconscious or unconscious wishes. The swindler offers a target for ridicule, a scapegoat for this purpose. Often it is some indifferent object which facilitates the release of control of the victim's fantasies. In the technique of the swindler, secrecy, mystery, monotony or intricacy are utilized to achieve this effect. In many cases involving wild-cat schemes, promising high returns, the very audacity of the swindler and his implied invincibility are sufficient to remove incredulity. Even among hard-headed business men, used to weighing the chances for profit in business ventures, a plan which was made sufficiently scientific or intricate had this same dulling effect upon the victim's judgment. Science, racial prejudice, belief in an imposing individual, finery and surface culture, etc., act in each instance as an object on which to displace the human wish to get something for nothing.

A good example of this is seen in the case of two Russians who were indicted for fraudulently obtaining $25,000 with the promise of increasing it tenfold:

> The offense for which the Count D. and Professor S. were indicted occurred in 1930. The victim, a successful business man, was introduced to the count and the professor, and given a preliminary showing of their counterfeiting process in action. The professor bathed a one dollar bill in acid until the original was bleached white and the numbers erased. In the presence of the victim, the bleached bill and one of larger denomination were wrapped around a pencil. With utmost carefulness and gravity, the professor rolled the pencil, around which were the tightly wrapped bills, across the floor. Again and again he did this, the victim watching the procedure narrowly. The process was interrupted by a solemn, critical examination of the pencil following each rolling. After about six hours of this activity, when the victim was on the point of fatigue, the professor felt that the proper treatment had been given and he opened the package, disclosing the newly-formed ten dollar bill. The next step was to have been the duplication of these bills in the "money-making machine."

The victim, impressed by the meticulous care and scientific precision of the experiment was convinced. At the next meeting he brought $25,000 in bills in a package, which were to be changed to bills of higher denomination. At this session, the professor, in mixing the two chemicals, made an error and nauseating fumes arose which overcame the victim. The count and the professor, profusely apologetic, rushed out to bring restoratives for the victim, who found when he came to, that his package of $25,000 had been replaced by one containing worthless paper.

On examination in the Clinic, Count D. was found to be a small, well-developed man who spoke fluent English and was unusually amiable and persuasive. He described himself as belonging to the ousted Russian aristocracy, claiming to be a graduate of the University of St. Petersburg. During the interviews he gave evidence of having wide knowledge and good comprehension. The count stated he was a commander in the White Army during the Russian Revolution. He related that he had come to this country to arrange colonization in Nicaragua for expatriated Russian nobility, a plan which was to net him $50,000 a year. He lived in fashionable hotels and spent his time among people of wealth. He had been arrested and discharged for uttering a worthless check in Berlin some years before.

The codefendant, "Professor" S., was found to be an obese and plethoric man, physically in good condition. He spoke English haltingly, offering to converse in French or Russian. The professor also claimed to have studied at the University of St. Petersburg, but was rather vague about his chemical knowledge. He gave a fanciful story about coming from a small tribe of Tartars who took over the Hebrew religion centuries ago. He utilized the ponderous confused air which was part of his personality, giving the impression that he was a scientist, a chemist, absorbed in scientific problems.

The psychology of swindles of this crude type is fairly obvious. Under the cloak of esoteric learning a foreign atmosphere and aristocratic tradition, the swindler hypnotizes his willing victim. In the same category, but on a less conscious basis, belong the switch-game swindles done by gypsies (case of A. C.). In this type of offense, the gypsy fortune-teller gives back a package which allegedly contains double the amount of money entrusted to the gypsy overnight, but which was "switched" for a package containing worthless paper. Why do people still succumb to such blatant trickery? It is because magic and the occult power to perform miracles is unconsciously projected to the gypsy by the victim. The aura with which we invest the gypsy makes it easy for the victim to indulge his fantasies and act them out, to his later discomfort.

There is a group of swindles where another series of emotional tendencies are brought into play. In this, sexual feelings, particularly for perverse or homosexual relations, are stimulated. The

offense of A. R., a man of 29 arrested for grand larceny, serves as an example. He had at least ten previous arrests for charges concerning larceny by trick. He was known by the police as a confidence man.

In the present offense, he accosted the victim on a city street, pretending to be a person from out of town who was seeking a "good time." He treated the complainant to a few drinks, then suggested that they go to a "party," in a hotel on the west side of the city. This was to be preceded by a visit to a burlesque show. The pair went to a hotel where three confederates joined them and began playing cards prior to entertaining some women. They played for small stakes until, in a burst of confidence, under the influence of the spirit of camaraderie, the complainant showed a bank book which recorded a considerable amount of money deposited to his account. The game was resumed and the stakes were bid up until the victim was allowed to win $7,000. The offender said he was willing to pay him his losses, but wanted to see the victim produce an equal amount of cash. The complainant hurried to the bank and drew his $7,000 in cash, anxious to fulfill his part of the bargain. Immediately thereafter, by ruse, the money was taken from him and the offender disappeared with his confederates.

In the Clinic the offender (A. R.) was found to be a slightly built, dapper person of high average intelligence. He was a characteristically well-groomed, suave, with a suggestive air of effeminacy in his manner. The offender's practice had been to engage strangers on the street in casual conversation, gradually working around to some sexual topic. He scrutinized his victims shrewdly, often detecting in them some indications of homosexuality or interest in sexual perversions.

Here is evident the common trick of the swindler who builds up sexual tensions in his victim in order to over-ride his judgment. This, we feel, is no accident, but part of the unconscious relationship through which the swindler creates his hold on the victim.

II.

It has long been known and reported in the literature that many swindlers and pathological liars showed deviations in their sexual life. Our material confirmed this. In the routine examination of our material, we found that more than half had histories recording a diminution of heterosexual impulses. Symptoms such as sexual impotence, diminished libido, intercourse only once or twice a year with little psychosexual satisfaction, marriages for convenience or for money and frequently changing sexual partners occurred. Many swindlers had feminine or homosexual tendencies in their dress and

manner. Offender, A. R. related, and this is common knowledge, that many confidence men of his acquaintance were from choice unmarried, living nomadic lives, suffering from definitely reduced sexual libido.

The intimate relationship between sexual maladjustment and the swindler type is indicated in the following case of P. X., indicted for bigamy:

P. X. was 35 years old, a man of superior intelligence, born in Austria. He was legally married to a wife in France and had been living with her in London prior to coming to this country on the pretext of selling an invention. In England he met a successful American woman lawyer, and accompanied her on the trip across. He courted her actively for a short time in New York and soon after married her. Shortly after this marriage (the bigamous one), about $25,000 was drawn from the account of his American wife, ostensibly for a wedding trip to Europe. She was never seen again. In the absence of evidence for homicide, the offender was indicted for and convicted of bigamy.

A study of the case showed deviations of significance in the psychosexual situation. The offender himself was a dapper, suave individual with distinctly feminine mannerisms. From pictures of the two wives and what was known of their life story, it seemed that they were both forceful, effective types of women. Apparently the first wife was a sadist. There was a mass of material, correspondence and evidence in their home to indicate that the relationship was a perverse one and that the offender played a masochistic rôle in their sex life. For example, in their apartment were found flagellants, chains, whips, belts and various types of apparatus for the purpose of inducing pain prior to sexual intercourse. The letters which passed between them and which were intercepted by the police retold day-long sexual orgies in which the defendant and his European wife indulged. They detailed an elaborate play-ritual between them in which the offender played a female "slave and little brother," and the wife the rôle of a punishing, masterful husband.

From the evidence we have of the life of the offender and his first wife, from the fantasies expressed in their correspondence, from the careful description of their sado-masochistic chamber in their home in Vienna from police records, we are justified in concluding that this particular swindler utilized submissive, masochistic elements in his swindles. He married the second wife obviously in order to get the money to serve his first wife. He ingratiated himself with her through his dress, cultural tastes, romantic servility and Continental chivalry.

This offender, then, utilized his sado-masochistic tendencies sublimated into acceptable social behavior in his bigamous and ostensibly pecuniary marriage.

From this case we pass to the general problem of psychosexuality in swindlers. What is the dynamic significance of this common

technique on the part of the swindler in which he assumes the masochistic, or submissive, rôle in the swindler-victim relationship? What is its significance from the standpoint of the psychology of the swindler? Our cases suggest that the adoption of a passive rôle towards the victim allows the swindler to overcome the former. As expressed in common language, "the strength of the swindler lies in his weakness." The analysis of another case suggests that taking something from the victim is an unconscious re-enactment of an older pattern of taking something from the father (or mother). This reaction to the earlier struggle against parental dominance takes the form of retaliation through submissiveness and trickery.

We must consider another aspect of psychosexual deviations in criminals, and that is its social significance. Commonly, abnormal sexuality is interpreted as an evidence of inferiority. An inner perception of this kind helps the victim to fall into the "swindle-situation" in which he believes he will be the master. For deep in the psychology of every victim can be glimpsed the presence of two infantile tendencies: first, the universal wish for unlimited money and second, the feeling of personal infallibility. The swindler, we feel, is aware of these deeper psychologic currents in the victim and utilizes them in his technique. He "woos" the victim, but in so debasing himself, is able to finally outwit the victim. It is common for the offender to complain that his victims themselves literally begged him to take their money. The swindler feels himself, and often is, the sought-after party to the transaction.

The following case of a man, I. P.,* convicted of grand larceny on six counts, illustrates some of these psycho-dynamics:

I. P. Offense.—At the age of 26, in 1927, I. P. worked in a brokerage house as statistician and securities salesman. In 1928, the group for whom he worked operated an international money-pool subscribed to by German-Americans, which would have the effect of forcing the franc down. The appeal was to the patriotic bias of the subscribers and received impetus from the rising tide of National Socialism in Germany at that time. The firm wrote to influential German-Americans all over the country. Within a short time, funds destined to purchase French francs poured in. People all over the country who were interested literally begged him to take their money.

* This case is reported through the courtesy of W. J. Harper and I. W. Halpern, directors of the Probation Departments of Westchester County and the Court of General Sessions, New York County, respectively.

By this time I. P. apparently had control of the business. Over a period of two years the offender accepted approximately $75,000 from various people for investment in a stock syndicate, promising a monthly rate of interest at 8 per cent. He promised the subscribers to use the money for marketing a machine which would transmute base metals into gold. Some of the money he spent on lavish living, but the rest he paid back at a high rate of interest to other subscribers, thus maintaining the vicious cycle. The offender was indicted on the complaints of six of his victims.

In 1934 he was arrested for bigamy, having married a radio singer, A. B., after previously being married in 1924. He had neglected his first wife since he became engaged in the stock swindle. After he had promised marriage to A. B. he produced spurious divorce papers, which were sufficient to convince his second wife. During the period preparatory to their marriage he caused her considerable inconvenience, ordering house furnishings for which he paid with worthless checks. He was given a sentence of five years for bigamy, but was placed on probation. During his probationary period he made a poor adjustment, continuing to get into difficulties, neglecting his family, passing bad checks, etc.

Examination.—The offender was a man of superior intelligence. His structure was of the pyknic type. Glib and suave, his speech was forceful and energetic; he used excellent language. His mood was often elated during the interviews, although at times he would have a brief spell of depression. He took great pleasure in his appearance, his clothes being matched, of a stylish cut, and his personal fastidiousness in such details as fingernails, shoes, hair was marked. Physical examination was negative.

Anamnesis.—I. P. was born in a small town in the Mid-West. His parents were rigid church people, the father being a Fundamentalist minister. The parents were frequently involved in church work and he was relatively neglected. He attended a small denominational college after his secondary school studies: secondary school ratings were not good, although at college the offender was an honor student and valedictorian for his class. I. P.'s parents insisted that he become a minister, but he rebelled against adherence to the Fundamentalist tenets. Because of the restrictive religious atmosphere at home, he developed a taste for secular reading.

Although he achieved no advanced degree at the university, his intellectual interests were wide—history, philosophy, law, art and music. Within a few years he had become a free-lance lecturer, an authority on Wagnerian operas. He claimed interest in all social and intellectual problems of the day, particularly because he wanted to overcome the moral emphasis of his early church teachings. I. P. made a great deal of his interest in philosophy, and spent much time in libraries and lecturing, often without pay. He preferred to study philosophy rather than care for his family. For several years he held positions as teacher in high schools and once in a small college in the Mid-West, but was forced to resign because of affairs with female students. He lost two positions where he had been teaching sociology and psychology, being described as "utterly irresponsible, financially." He frequently passed bad checks, many of which his father covered.

Sexual Life.—The sexual life of our offender was full of pathology. At eight or nine years of age he practised manual masturbation with boys and girls. With one of these boys he continued his activity into adult life. Heterosexual life began after college. In it he demanded that his partner take the lead in the preliminary play and in the act itself. Otherwise he only cared to manipulate his partner manually. It was particularly exciting for him to play with the cervix and the greatest excitement resulted if the woman writhed in pain. He had a homosexual affair with a man during his 15th to 17th years and with the same man from 22 to 26 years of age. His partner would perform fellatio on him while he masturbated the partner.

When he came to New York, I. P. was pleased to find opportunity for free sexual expression. Later when he was making money from the stock manipulation, he spent a great deal of money on Broadway night-clubs and women who would do his bidding. For this he chose women on a higher plane than the ordinary prostitute. I. P. looked upon manual manipulation as a more esthetic and less primitive form of sex activity than normal intercourse. Gratification from intercourse was never deep or lasting for him. He left his first wife because he was unsatisfied sexually. Both wives of the offender state that he did not care for the usual sexual relationship, desiring only masturbation. When the first wife became pregnant he flew into a rage, claiming it was impossible. He became similarly enraged at the second wife when she demanded normal intercourse. He often rationalized this weakness by saying that his intellectual pursuits and lectures destroyed his sexual libido.

Psychoanalytic Material.—The patient was free in his productions. He regarded his father as a cruel, stern, harsh man. Most deeply he resented his father's hypocrisy, as revealed by the latter's sermons in contrast to his beating his mother when angry, or hitting the son. His father's callous treatment of mendicants impressed him. But he also felt that his mother was against him. He could not use his mother as a confidante since any confession to her was invariably repeated to his father, with subsequent punishment. His mother's goitre made him ashamed to walk with her on the street as a child, and he fantasied that the goitre was full of some kind of poison and would burst and poison people around her. A great source of resentment was his neglect by both parents because of their church activities, which meant many lonesome afternoons and evenings for him.

Towards his mother, I. P. maintained a special relationship. He was never friendly with her because she resented his kissing or hugging her. Later in life, when she became ill, he found it difficult to be solicitous about the illness. He was not entirely sure he wanted her to get well. There has always been a feeling of strangeness between his mother and himself. He frequently thought of and dreamed of her as dead. She would often punish him as a child by keeping him without food. Despite his aggressive feelings towards his mother, it was chiefly towards his father that his hostility was openly expressed.

As a child he entertained many fantasies of aggressive and sexual nature. His play as a child frequently involved a boy who was about to be executed.

He would always be the executioner and the victim someone he disliked. Another of his childhood pleasures was to pay another boy to beat an "enemy," and to watch from some vantage point. He had "blacklists" of people on whom he would some day take revenge. This list included teachers, leaders in the neighborhood and leaders of the boys. In fantasying executions he stated that he actually had erections.

The aggressive fantasies continued throughout his life. His dreams and fantasy formations were very vivid and frequent in adulthood. He often would picture himself about to be killed by hanging or leaping in front of a train. I. P. would actually feel his arms or legs being severed from his body. While walking on the street he would picture the penis of some man being cut off, with the blood running down. At the same time he would feel his own genitals shrinking or being cut off. Once he recalled getting an erection as a child when he saw a moving picture in which a man was being hanged. He would also visualize cutting off the breasts of women, cutting off their heads or ripping open their abdomens with a hooked instrument. These fantasies would be so vivid he would actually be frightened. He would ultimately see himself about to be executed for the murder, and his making a speech from the execution platform. In association with this he recalled a scene at the age of nine years. He saw a girl beaten across the bare buttocks, which stimulated him to an erection. In later years he would often revisit the same neighborhood, and become aroused and masturbate or have nocturnal emissions.

Other dreams were full of castration anxieties and punishment motives for attempted sex contacts. He dreamt: "I was lying on a bed and father came in with sores all over his body. Father said, 'I am guilty; I have a disease,' then he chased me down a hall. He cornered me and I jumped on a cabinet. Some women were in the hall with the same sores. One jumped up on the cabinet and attempted to embrace me. I began getting the sores. I ran into an electric cabinet and was afraid of being electrocuted." His associations led to his envy of his father's penis and to fear of him. At seven he first saw his father nude, with the corpulent abdomen and large phallus. This greatly revolted and frightened him and he thereafter would visualize him when in the pulpit as nude and earthly.

Another dream: "I am riding in a cable car at Coney Island. There were nude women with long hair on their arms and large breasts in the other cars. I wanted to catch them but could not. They laughed at me." Associations led to a girl of distinctly masculine type whom he likes. Then he speaks of homosexual experiences when he was adolescent, and of fantasies of having his genitals cut off.

Other dreams dealt with cutting and crushing women's sexual organs and then his own. There was a great deal of unconscious material of this type uncovered. The alternation between masochistic and sadistic attitudes was vivid. Two dreams which typify his ambivalent attitude towards women follow:

"I am master of a terrible land of ferocious men. I direct the torture of women captives. Women are tied to a pole and javelins are thrown at their

stomach, head and breasts. They are nude." The other dream is, "I was a dwarf in the land of naked women. They had huge buttocks and pendulous breasts. They would stand in a row, their legs apart and I would walk under their legs. They urinated down on me." His associations revived the memory of seeing a nude woman lying on the bed at the age of four. He remembers seeing his mother nude, walking to the bathroom, and his lying on the bed listening to her urinate. Later he often fantasied the actual bathroom scene. Through his dreams run the pictures of voluptuous women.

The sadistic attitude towards women, frequently observed in the offender's dreams, represented in the unconscious layers a wish to destroy their genital organs. His fear of his father was expressed in castration ideas. His attitude of distrust and hostility to the father, and his feeling of emotional coldness towards the mother had a basis in these unconscious tendencies. The dream life shows the fear that women will destroy his virility by enveloping him and he will be crushed, mutilated, emasculated. This is probably the basis also for his desultory and ungratified psychosexuality. This has been interpreted as the result of a failure of the Œdipus resolution. His father did not serve as an instrument for identification but served to keep alive his feelings of hatred. The offender's choice of occupation apparently was dictated by this inner hatred of the father. The situation is complicated by the fact that he is an only child.

Abraham [5] has studied a case of a swindler based on a similar mechanism—the swindling representing an infantile wish. In this case Abraham considered the crime to be due to libidinous regression following a failure in resolution of the Œdipus situation.

III.

Discussion.

Our study of 50 cases of swindlers has thrown some light on the psychologic aspects of this type of larceny. The swindler is a hysterical individual who obtains substitutive gratification through living out a high social position such as physician, nobleman, entrepreneur. Another and more common type obtain gratification through less symbolic means, by tricking their credulous victims out of money. In all swindlers there is a basic personality deviation which approaches the obviously hysterical psychopath on one hand and the masked-neurosis on the other. Material is presented from the offenses themselves and from the lives of the offenders to illustrate these aspects of psychodynamics.

Beyond the psychopathic character of the swindler we wish to emphasize in this investigation the universality of the basic psycho-

logic mechanisms to be found in the victims of swindlers. One can call this the "swindle-situation." The crux of this "situation" consists in the attempt to impair the censor function of the victim through stimulation of his fantasies. Confidence men and swindlers appreciate and apply this basic principle. Pursuing this somewhat further, we have found that the swindler utilizes a form of psychologic approach akin to seduction, as he stimulates the fantasy of the victim through thinly-disguised homosexuality or perverse sexuality, or through more common methods utilizing magic, mystery, secrecy or scientific intricacy. What the swindler manages to do is to offer an outlet for the fantasy of the victim, and wishes and impulses known to be unethical or actually criminal are released under the concededly "fascinating personality" of the swindler.

In a sense, these artifices allow the swindler to take control of the conscience of the victim, allowing the release of feelings of greed. It is noteworthy that most of the victims of swindlers are notoriously saving individuals; moralistic, law-abiding citizens. They are, as is commonly said, "innocent victims." Many fail to complain to the authorities, realizing perhaps their own culpability. In swindling, the swindler is aware of these character reactions, and apparently it is the source of some of his gratification.

In considering the psychodynamics of the offender himself, we have found that basic conflicts often bring him into the arena of swindling. These conflicts may relate to ambivalent attitude towards the parents. They are expressed by unconscious hostility which is reflected in actual life reactions. Swindling, for some of our cases at least, served as a substitutive gratification for this hostility. By identifying all men with the father, and women with the mother, this complicated neurotic reaction observed in our offenders is brought to the surface. The unconscious hostility of the offender is expressed in a subverted way. Instead of taking its form in open aggression, as in crimes of assault, robbery or outright theft, this feeling is expressed indirectly. Here we have aggressive feelings expressed in socially acceptable form, *i. e.*, the accredited drive for money. Keiser and Schilder [15] have shown in crimes of physical violence that many offenders react to deeper feelings of passivity and femininity by their aggression.

This veiled aggression, under the guise of submission, is a point of some importance in the psychology of the crime of swindling.

We know the swindler utilizes his guile, insinuating himself into the good graces of his victims, and rarely resorts to physical violence. Our civilization opposes passivity to aggressivity, by attributing the former to the feminine psychology and the latter to the masculine psychology. The type of approach we have described belongs in the category of the so-called "feminine" psychology. A discussion of this would take us far afield into social psychology and the study of attitudes as they have been built up in the civilized world. It suffices for our purpose to note that passivity is given a different connotation in the public mind from that of aggressive acts. The swindler, with his elegance of dress, his superficial culture, urbanity and suavity, can hence be aggressive under his outward passivity. As far as the inner psychology of the swindler is concerned, this "passive technique" serves at one and the same time his unconscious masochism and his desire for mastery over the dominant influences in the early environment (father) and the present environment (public).

Summary.

A study of swindlers convicted in the Court of General Sessions, New York, was made to ascertain the psychologic meaning of this offense. We have found that in the swindler himself the offense often means an unconscious gratification of a neurotic conflict. Neurotic conflicts of a psychosexual nature form an important aspect of the swindler's personality.

In addition, there is a psychology of the total situation to be considered in this as in all offenses involving society. In this group of offenses we have described and termed this as the "swindle-situation." Here there are found psychologic mechanisms, perhaps unconscious, common to all men which operate in the victim.

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DISCUSSION.

DR. KARL M. BOWMAN (New York).—I believe the purpose of a discussion of papers is to evaluate the work shown in the papers with general trends in the subject, and to point out how they do and how they do not satisfy our present knowledge of it.

I have been struck with the papers presented this morning and this afternoon so far, with the different types of approach which have been made to this problem of criminality. We see one writer emphasizing constitutional factors, another cultural factors, another special conditioning experiences, and we are, perhaps, left with the idea that either they must all be wrong,

or they must all be right, and perhaps a little bit of both. Perhaps all of these factors are of great importance. Each writer has simply emphasized a special factor which to him is of great interest and which he has studied rather intensively.

We find also that the studies are made in various ways, that one writer by an intensive study of one or two cases, endeavors to draw conclusions with regard to what occurs in all cases; whereas, other writers take large series of cases and attempt to work out a more or less statistical type of approach.

The two papers that we have just heard have been to some extent a combination of these two methods, because both Dr. Thompson and Dr. Bromberg have drawn on a large series of cases and then by attempting fairly intensive studies on a few, have combined a statistical approach with an individual approach to selected cases.

Dr. Thompson gave us some important and valuable observations on the whole problem of the repeater, the individual who gets into one crime after another, and it seems to me there are two parts to his paper. One is the positive observations, the objective observations, and then the more or less subjective conclusions which he draws from it.

The objective observations I regard as of great importance, and I think their validity is well established. At the Court of General Sessions, there is a large group of cases, and he is able to devise statistics which should hold.

When we come to his interpretation of this explanation of the problem of recidivism, then we come to an individual interpretation from which we may differ greatly.

Dr. Thompson, as I understand, takes the work of Trigant Burrow, applies this problem of personality and special conditioning to everybody, but insists that it occurs with greater force in these recidivists, and feels that the important observation is that they show an extreme form of exaggerated ego preoccupation. I would agree that they do, and yet I wonder whether that is confined to this type of criminal, whether without a great deal of control material both among other types of criminals and in the so-called normal population we should attach too much importance to it. Possibly we would find among successful business men, or in any other highly successful group, quite the same condition.

As to whether this is in any sense a total explanation, I question. I doubt if Dr. Thompson meant to convey that idea, but granting all of his observations, it seems that is only one aspect of understanding this group. It would, of course, be asking the impossible to expect Dr. Thompson to give us a complete and thoroughly satisfying explanation.

Dr. Bromberg and Dr. Keiser have taken up an expression group, using 50 cases of swindlers and again it seems to me that Dr. Bromberg has presented the material in the same fashion as Dr. Thompson. There are the objective observations, the descriptions of the cases, the statistical material, which is most important and most valid, and there is the individual interpretation of special cases, and an attempt to generalize from that, which is more

open to question. It expresses the individual views of the authors, and is an attempt to utilize the orthodox psychoanalytic formulations to explain this group.

Probably the attitude of most of the audience will depend on their general attitude towards the psychoanalytic approach as to whether or not they accept an explanation of this sort. There are one or two points, though, that I would like to raise in the form of criticism, for as I said before, I think the purpose of any discussion should be to raise criticisms.

There is an attempt to formulate submissiveness as a feminine attribute, and aggressiveness as a masculine attribute. The work of Margaret Meade shows rather conclusively that aggressiveness and submissiveness are not sex characteristics, that in various societies varying degrees of submissiveness or aggressiveness are found in either sex, and that it is determined much more by the cultural setting in which we live.

Our present culture more or less demands that males appear aggressive, and as has been brought out in one talk this morning by Dr. Alexander, that idea of great aggressiveness and certain cultural standards in this country he feels is important in the crimes and the criminals in this country. I would insist that this is purely a cultural idea, that at the present time we simply insist that males should appear aggressive and dominating whether they are or not, that we insist that females appear submissive whether they are or not, and, therefore, each sex cloaks whatever tendencies they may have under this outward appearance of conforming to the cultural pattern.

I personally feel there is little validity to the labeling of aggressiveness as a masculinity trait and submissiveness as a feminine trait.

The most valuable contribution in these papers seems to be that both of them are to begin with objective observations, careful case studies of a large group of cases, and that in our present rather bewildered state as to the cause of crime, our very unsatisfactory way of dealing with it, this is the type of research which is most needed for us to get our feet on the ground and to really get somewhere in dealing with the problem.

PAROTID GLAND SECRETIONS IN MANIC-DEPRESSIVE PATIENTS.*

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The parotid gland secretions of humans, as measured by a modification of the Lashley suction disc, have in recent years been studied extensively at Cornell University by A. L. Winsor. He confirmed Lashley's findings of a continuous parotid gland flow in the absence of marked extero-stimulation. It was also observed that the rate of this secretion, while fairly constant within the same individual, varied from individual to individual.

However, it was found during the course of experimentation on average "normal" subjects that there was a definite range of secretory rate beyond which these subjects did not vary. But when the subject experienced an emotional disturbance, or when he was engaged in working on a problem that required intense concentration, the parotid gland underwent a change in its secretory rate.

It was these and allied observations which made us feel that further investigation on patients with psychogenic problems, in whom emotional disturbances are encountered, would be of interest.

This report will discuss the parotid gland secretory rate and pH in the manic-depressive patient as compared to that found in the deteriorated dementia præcox patient and both will be compared to the secretory rate of the average "normal" individual.

In a previous report given at Atlantic City at the American Association for the Advancement of Science meeting we discussed the effect of mental deterioration upon the parotid gland secretory rate. Since this article is still in press a brief review of it would be of interest here as the new work to be reported is a further development of the previous report.

* Read at the ninety-third annual meeting of The American Psychiatric Association, Pittsburgh, Pa., May 10-14, 1937.

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METHODS.

A. Secretory Measurements.—The technique used was essentially that used at Cornell University by A. L. Winsor and his assistants and has been reported at length in previous papers.

It is sufficient to indicate that a small disc similar to the one developed by Lashley is fastened by suction over the mouth of Stenson's duct. From the inner chamber of this disc a small air-tight drainage tube passes through the corner of the mouth carrying the secretion to a device capable of measuring in hundredths of a cubic centimeter. The collecting device itself does not affect the flow of secretion or seriously interfere with the mouth movements of the individual. The sensitiveness, harmlessness and simplicity of the apparatus, as well as the accuracy with which variations in reaction may be measured, make it particularly useful for experiments of this type.

The subject was seated in an easy chair and instructed to assume a comfortable position. In order to avoid distracting influences the subject was in one room while the observer and the measuring apparatus were in an adjoining room, which was connected by means of a one way screen through which the subject could be observed.

After the disc was properly adjusted he was instructed to avoid excitatory movements of the tongue or throat, except as directed, and to keep his mouth closed. In order that accumulated secretions from other glands of the mouth might not interfere with the throat movements the subject was permitted to swallow at the end of every five-minute period. This swallow was corrected for in the data. Readings were made every minute.

In work of this sort it is essential that physical movements be kept to a minimum, since physical activity of any sort influences the rate of secretion.

B. pH Measurements.—The Beckman glass electrode apparatus was used.

All experiments were performed 1½ hours after meal times in order to avoid the factors of hunger or satiation both of which influence the secretory activity of the glands.

Our previous findings can be summarized as follows:

A. The Normal Group.—The average of the normal secretion is .07 c. c. for five minutes over a two hour period. The lowest average secretion of any subject is .02 c. c., while the highest average for any subject is .15 c. c. These data were taken at Cornell University by Winsor and Strongin, and in some cases readings have been obtained on the same subject at various intervals for a four year period.

B. The Late Psychotic Group.—The average secretion of this group is .38 c. c. for five minutes over a two hour period. The lowest average for any subject is .23 c. c., while the highest average for any subject is .74 c.c.

The present report will deal with six manic-depressive patients. On two of these patients we have records of both manic and depressed phases, on two we have records during the manic phase and on two during the depressed phase.

Results.

I. Parotid Secretory Rates.

A. Manic Group.—The average secretion for five minutes over a one hour period ranged from .03 c. c. to .09 c. c., with the average being .065 c. c. If we compare this with the normal group we can see that the secretory rate in the manic patient falls within the normal range with the average being very similar although it must be borne in mind that this manic group consists of only four patients.

B. Depressed Group.—The average secretion over a one hour period ranged from .001 to .01 c. c. per five minute period with the average being .005 c. c. Here we can see that the secretory rate in every case is below the lowest rate that occurs in the normal person.

In both our cyclic manic-depressive patients, in the manic phase the secretory rate fell within the normal range, whereas in the depressed phase the secretory rate was below the normal range.

II. Hydrogen Ion Concentrations.

A series of preliminary experiments have been done in order to determine if there is any relationship between the parotid secretory rate and the pH of the saliva. This work is still in progress and we should at this time merely like to point out that a definite relationship seems to exist between these two functions, namely, as the rate of secretion increases the pH goes up so that we find that our deteriorated group which has a higher secretory rate has the highest pH whereas the depressed group with its extremely low secretory rate has a lower pH. In other words the depressed patient has a more acid secretion than the average normal individual while the parotid gland secretion of the deteriorated præcox is less acid than that of the other groups.

Summary.

An attempt has been made to determine the rate of parotid gland secretion on a group of manic-depressive patients while they were awake in the absence of marked extro-stimulation. Some hydrogen ion determinations were also made. The parotid gland secretion on one side for five minutes over a one hour period shows an average secretion with

A. Normal subjects of .07 c. c., the range being from .02 to .15 c. c.

B. Manic patients of .065 c. c., the range being from .03 to .09 c. c., this falling within the normal secretory range.

C. Depressed patients of .005 c. c., the range being from .001 to .01 c. c., this rate being definitely below the normal secretory rate.

Preliminary findings on the hydrogen ion concentration of the parotid gland secretions indicate a correlation between the secretory rate and the hydrogen ion concentration, namely, the higher the secretory rate the higher the pH. In other words the depressed patient has a more acid secretion than the average normal individual while the parotid gland secretion of the deteriorated præcox is less acid than that of the other groups.

DISCUSSION.

Dr. Roy D. Halloran (Waltham, Mass.).—This paper reviews and presents for new consideration some physiological observations in the study of mental states. The authors are to be commended for applying to clinical studies in psychiatry the principles of Pavlov's technic improved and applied to humans by Lashley. This further advances attempted correlations between physiological and psychological activities, although this work is still too incomplete to be more than suggestive. The natural question in such studies is the full reliability of the facts and the interpretations permissible. As has been clearly stated, the cases studied are too few to warrant any conclusions.

Before results may be compared with the accepted normal, it would be well to ask whether sufficient allowance has been made for the factors of individual variability and uncontrollable stimuli from external and especially internal sources. The careful observations of Lashley, Winsor, and others seem to strongly support the authors' assumptions. However, nothing has been said of common mouth conditions, such as pyorrhea, dental caries and stomatitis, which may influence glandular activities and the pH and are frequently found in chronic mental states.

Is it possible to entirely eliminate the effect of emotional excitations due to any object held in the mouth over a prolonged period, especially in such states as dementia præcox, where emotional reactions are so difficult to interpret? Bianca and Szczpanski report that any stimulus in the mouth over a period tends to produce a slower secretion with a higher pH and a lower chloride content.

Again, I would ask the reason for the selection of dementia præcox as representative of the late psychotic group, since drooling is commonly seen in many deteriorating organic states, such as Parkinson's disease, seniles, epileptics and in idiots where there is claimed to be an increase in secretions with a diminished swallowing only when the secretion is excessive. I believe that this question is in part answered by some of the explanations of Dr. Strongin in his material that was selected at the Institute.

The factor of smoking should be carefully considered since some workers claim that the smoker has a higher concentration of the saliva and a diminished quantity. Obregia, Dimolescu and Sulica, in 1933, with alkalisulphocyanate tests showed the concentration to be double. Their work also indicated a still greater concentration with a high pH in general paralysis, dementia præcox and epilepsy. In the manic-depressive it is also increased, especially during excited phases. This would indicate the desirability of studying the concentration as well as the rate.

A German worker, Max Kuck, found that the parotid secretion, which has a diluting function, represents only 30 per cent of the salivary gland secretion. This would suggest, therefore, a study of other salivary glands because of their different function.

In the authors' cases, diminished secretion is found in the depressed phase of the manic-depressive psychosis, as was indicated in the graphs. Could this be due to the inhibitory action of the increased acidity as shown by the diminished pH accompanying some mouth conditions independent of the mental state? This same worker, Kuck, found that if acidity is increased, there is a tendency to stop digestive action of the saliva. This action in the stomach suggests correlative studies of hydrochloric acid determination in gastric analyses.

Since only speculations are possible, may we not expect a diminished parotid gland activity in such states as the manic-depressive depressions, where the physiological and psychological activity is retarded, whereas in dementia præcox increased gland activity may conceivably result from a functional dissociation between the two divisions of the autonomic nerve supply with failure of the sympathetic and excessive activity of the parasympathetic control? This would seem to suggest a qualitative analysis as well as a quantitative, to determine, if possible, the different constituents of the two different secretions of the parotid gland.

In closing, this very stimulating early work of the authors indicates the possibilities for extensive salivary gland studies in larger series and in a wider variety of mental states, with perhaps a better understanding of the very complex rôle of disturbed glandular secretions.

DR. P. G. HAMLIN (Motorun, Va.).—Not very many years ago I was on the staff of a mental hospital. Occasionally when we were discussing our friends, a rather well publicized hospital superintendent's name would often be injected into the conversation. We were accustomed to say, I am afraid somewhat in derision, that the criteria, apparently, established for the discharge of patients as cured from his hospital were that the patient would shake hands with the superintendent when he left and did not drool saliva. Although, as I have said, this was told in jest, perhaps some of us felt there might be some possible connection between the state of the salivary flow and clinical improvement, or its absence. Most of us, I think, let it go at that. We may have had some more or less vague conception that the innervation of the parotid, the double innervation of the parotid and other salivary glands by means of the cranial autonomic and sympathetic, had something to do with it. We may have known as these were stimulated, vaso-constriction or vaso-dilatation was produced, and the blood supply to the gland was altered and in consequence the salivary secretion changed in quantity or in the relative proportion of its constituents. We may have had some rather vague idea of what the hydrogen ion concentration of the secreted fluid was supposed to be. We may have had some conception of the psychic excitation of the salivary flow, as understood in the conditioned reflex literature.

All of these things we accepted as written in the standard works on physiology without bothering to go into any more specific details ourselves.

This paper seems worth while, particularly in that it seeks to correlate physiological observations with certain clinical-pathological-mental states and by doing so, helps to remove the criticism that I hear in my particular part of the world so often leveled at psychiatry by practitioners of other branches of the healing art, that it has little or nothing to do with medicine.

DR. EUGENE S. FALSTEIN (Elgin, Ill.).—I would like to ask Dr. Strongin two questions. One is, does he feel that maybe one of the reasons why there was an increased salivation was because the patient did not cooperate and would rub his tongue against the capsule? The second question is, does he feel there is correlation between the amount of food a person has, say, an hour and a half before the test and the amount of salivation? I wonder how that is reflected in the patients.

DR. EDWARD I. STRONGIN (New York, N. Y.).—To the question whether sufficient allowance has been made for the factors of individual variability and uncontrollable stimuli from internal sources, I would say we took the normals that were collected over a 10-year period and we had about 200 subjects in the normals, and on those 200 subjects we ran a few thousand experiments. Whether it is completely reliable or not we couldn't say.

As far as the effect from the disc itself was concerned, the disc is extremely small. Dr. Lashley investigated that factor by adding additional discs and did not get any effect. In addition, instead of the disc becoming more noticeable when it is in the mouth for a long period of time, it becomes

quite unnoticeable. It is so small and stands out so slightly that the subject soon adjusts to it and forgets its presence.

As to reports of a lower chloride content with stimulation. We have not studied the chemistry of the saliva as yet. As a matter of fact, we feel that it is important and plan to do so. I might say Bramkamp recently reported there was a higher chloride content when the secretory rates increase.

The reason for the selection of dementia præcox was that we had to start somewhere and we decided we wanted a group where organic factors would be eliminated, as far as we knew, so we started with a group of deteriorated præcox patients. We intend, however, to take in the organic phases as well.

As to the factor of smoking, we found that smoking increases secretion during the time of smoking and for a few minutes afterwards. Consequently, our patients did not smoke for an hour and a half before the test, and we, in previous work we had done on the normals, could find no indication that smoking increased the secretory rate for a period beyond about fifteen minutes, so we felt we were safe there.

As far as the effects upon the concentration of saliva, I presume by concentration is meant the chemical constituents. We didn't report on that at present, so that whatever effect smoking would have on that would not enter into this particular problem. In our subsequent work, we will have to be careful about that factor, because the parotid glands do secrete certain substances after smoking which may possibly be secreted for some time afterwards, and that should be taken into account.

As far as the factor of dental caries is concerned and the effects upon pH, Gans, Lathrop, Matthews, practically every man who investigated that problem, reports that there is no correlation between the pH of saliva and dental caries.

I believe that answers some of Dr. Halloran's questions. The other questions raised: How did we get the deteriorated præcox group to cooperate? As a matter of fact, peculiarly enough, we found the deteriorated præcox group was the easiest group to work with, due to the fact they were quite satisfied to sit quietly. Once we sat them down and they got accustomed to the comfortable easy chair we got for them especially, they seemed to like it. If we had wanted to continue the experiment for a longer period, it would have been an easy thing to do.

Another thing that surprised me was with the manic patients who were difficult to get to the laboratory, and also difficult to get away. When they actually had sat down and you asked them to cooperate for a half hour or an hour, they, surprisingly enough, would do it in most cases.

As far as the factor of food is concerned, we find that the secretory rate goes up just before and just after a meal. We find about an hour and a half after that meal it has subsided and it has more or less reached a plateau which will be retained for about an hour and a half and then begin to go up again. So we try to do all our experiments within that plateau period. We checked it by doing some in the afternoon and some in the morning, but

always on the same patient every experiment would be run at exactly the same time of the day. Naturally all other conditions that we were aware of, such as diet and everything else, were kept under control.

As far as the effect of various types of food was concerned, it didn't make much difference, provided the patient didn't have coffee, caffein, which would stimulate secretion or alcohol, which would inhibit the secretion, and give a drug reaction.

As far as the type of food, we were not able to get a difference in the secretory rate. There may be a difference in chemical constituents, but that, as I say, we will investigate at a subsequent time.

Comment.

TRIBUTE TO DR. JELLIFFE.

A notable event took place April 22, 1938, at the New York Academy of Medicine when the friends of Dr. Smith Ely Jelliffe assembled to do him honor in recognition of his 35 years of service as editor of *The Journal of Nervous and Mental Disease*.

The celebration took the form of a neuropsychiatric symposium at which addresses were presented by Drs. Adolf Meyer, Earl D. Bond, George Draper, Frederick Tilney, Oskar Diethelm and Karl Menninger.

The evening was given over to a largely attended subscription dinner at which Dr. Jelliffe was the guest of honor. Dr. Foster Kennedy acted as toastmaster and the following speakers responded: Dr. A. A. Brill, "Jelliffe as Psychiatrist and Psychoanalyst"; Dr. Louis Casamajor, "Jelliffe, the Man"; Dr. H. A. Riley, "Jelliffe, the Neurologist"; Dr. R. H. Hutchings, "Jelliffe, the Bibliomaniac."

Dr. Jelliffe's career in the field of neurology and psychiatry has been a long and distinguished one, and to his leadership as clinician, investigator, writer, teacher and editor, THE AMERICAN JOURNAL OF PSYCHIATRY pays sincere respect.

THE SYNDROME OF *IMU* IN THE AINO RACE.

An ethnological-psychiatric study of considerable interest concerning the Aino people, an aboriginal type found only in Northern Japan, is reported in the January 1938 issue of *Psychiatria et Neurologia Japonica*. Uchimura and Akimoto of the Psychiatric Clinic of the Imperial University of Tokio, and Ishibashi of the Psychiatric Clinic of the Imperial University of Hokkaido, spent several years in a psychiatric investigation of the Aino race, which, in 1934, numbered about 17,500. In this survey were found 111 cases of a peculiar psychogenic reaction among the women (the *imu* syn-

drome), representing about two-thirds of the psychiatric material in this aboriginal "race island."

This syndrome, although well known, had not previously been carefully investigated. It is described as a fear reaction with stormy activity, echo symptoms, reversed behavior, command automatism, catalepsy and diminution of critical inhibitions. It was much more prevalent in the past and included men as well as women. In the present survey only one male case was found. Changing cultural patterns have markedly influenced the incidence of this condition, localities bordering on more civilized areas and in which specific Aino social traits have been more or less lost, presenting only isolated cases of the *imu* reaction, and these only in older people.

When an *imu* patient is exposed to a fear stimulus which in ordinary life would produce no abnormal reaction she goes automatically into a state of severe confusion with the symptoms previously mentioned. The duration depends upon the severity of the stimulus but as a rule does not exceed several minutes and the patients are soon themselves again without noticeable amnesia. Any strong stimulation may serve as a fear stimulus. It is noteworthy that the sight of a serpent or merely hearing the word "serpent" is the most frequent cause of an attack, although other animals such as frogs and seapolyps may precipitate the reaction.

Patients report that attacks are provoked regularly by the objects which precipitated the original reaction. About 60 per cent of the cases followed fright by serpents. To be mentioned also is the Aino belief that in any case of physical illness a patient may receive a demoniac suggestion that instead of getting well she will become an *imu* subject. In a few cases the *imu* reaction was the result of imitation of *imu* patients in the neighborhood. Among those most commonly held responsible for the demoniac suggestion, which seems to be a sort of autosuggestion, were persons who were themselves *imu* patients.

In the opinion of the investigators *imu* is a peculiar psychogenic reaction of the Aino race which dates back to the earliest times and developed on the basis of the primitive psychic disposition of this people with their heightened suggestibility and emotional lability and on the foundation of the traditions and superstitions peculiar to them. It is distinguished from acute fear reactions by the symptomatic habituation of the *imu* reaction; and from the usual hysterical

phenomena of civilization by the more undifferentiated, monotonous, transitory, passive and automatic characteristics; in other words it displays more of the primitive type of reaction. In view of the fact that among the Aino scarcely any other hysterical phenomena are to be observed the investigators concluded that *imu* is the Aino equivalent of the hysteric reaction. The rare cases of the more usual forms of hysteria are probably to be interpreted as of later origin through imitation. *Imu* in common with similar conditions of other aboriginal peoples may be regarded as a primitive hysteria or as an ancestral form of hysteria. In this connection may be mentioned the phenomena of *latah* in Java.

News and Notes.

TWENTY-FIFTH ANNIVERSARY OF THE HENRY PHIPPS PSYCHIATRIC CLINIC.—The 25th anniversary of the Henry Phipps Psychiatric Clinic was fittingly celebrated April 15 and 16, 1938.

On the afternoon of the 15th guests assembled in Hurd Memorial Hall and listened to an Introduction by Professor Adolf Meyer, who was also to have presented portraits of Mr. and Mrs. Henry Phipps but their completion having been delayed two crayon pictures had to be substituted. There followed a scientific session at which clinical and laboratory studies were reported by members of the staff of the Phipps Clinic.

In the evening following a buffet dinner served in the Amusement Hall of the Clinic the guests reassembled in the Hurd Memorial Hall where Drs. Dorothea and Alexander Leighton presented a colored film "Methodology and Cultural Anthropology" showing a community of Micmac Indians in various activities of industry and play. Dr. Richard S. Lyman, formerly a house officer and later director of the laboratory of internal medicine, presented a film "Scenes from a Psychiatric Hospital in Peiping," this hospital having been organized by Dr. Lyman. Concluding the evening program Dr. Norman Cameron presented a colored film from the 24th anniversary including views of the garden party given by Dr. and Mrs. Meyer.

On Saturday morning was held a second scientific session with members of the staff contributing. Of special interest was Dr. Meyer's closing review in which he discussed and evaluated the material which had been presented as representative of the activities of the Clinic.

The presence of Dr. D. K. Henderson from Edinburgh, and Dr. Lyman from China, was especially welcome, and various cities of the United States were well represented.

TENTH INTERNATIONAL MEDICAL CONGRESS FOR PSYCHOTHERAPY.—The tenth International Medical Congress for Psycho-

therapy will be held in England at Balliol College, Oxford, July 29 to August 2, 1938 by the invitation of a number of British Societies. It is anticipated that a large number of delegates representing the various countries will be present at this Congress, further details of which will be made public in the near future.

President of the Congress is Professor C. G. Jung, of Zurich; the honorary secretary is Dr. E. B. Strauss, 81 Harley St., London, W. 1, to whom inquiries for further information may be addressed. It is requested that those expecting to attend the Congress or to offer contributions communicate with the honorary secretary as early as possible.

COOPERATIVE AGREEMENT BETWEEN WESLEYAN UNIVERSITY AND THE NEURO-PSYCHIATRIC INSTITUTE OF THE HARTFORD RETREAT.—President James L. McConaughy of Wesleyan University at Middletown, Connecticut, and Dr. C. Charles Burlingame, Psychiatrist-in-Chief of the Neuro-Psychiatric Institute of Hartford, have issued the following joint announcement:

> Wesleyan University and the Neuro-Psychiatric Institute of the Hartford Retreat announce a cooperative arrangement whereby the Wesleyan Master of Arts degree will be awarded to competent students in the Institute, and Wesleyan and the Institute will promote a faculty exchange.
>
> The degree of Master of Arts will be conferred on such students of the Institute who, in the second or third year of their training complete courses and research which meet the regular requirement for the Master of Arts degree at Wesleyan. The work will be done principally in Hartford under the direction of the department of psychology at Wesleyan.
>
> Dr. William A. Hunt, member of the staff of the Institute will next year give at Wesleyan two courses in the department of psychology: applied psychology and abnormal psychology. Dr. Hunt is a graduate of Dartmouth with graduate training at Harvard. He was formerly a member of the faculty at Dartmouth and Connecticut College for Women.

The agreement, believed to be first of its kind ever made between a university and a psychiatric institution, comes after a two-year period of study and preparation by President McConaughy, Dr. Burlingame and Professor John A. McGeoch, head of the psychology department of Wesleyan University. It provides that graduate students pursuing the course leading to the Master's degree will spend one year at the Institute as psychiatric aides, supplementing practical experience with regular courses of study. The second year

will be devoted to special work under the joint direction of the Institute and the department of psychology of Wesleyan.

By this arrangement a two-fold purpose will be served, in providing an opportunity for students majoring in psychology to obtain experience in abnormal psychology, leading to a Master's degree and, at the same time, raising the level of care for those suffering from psychiatric disorders.

More than 80 of the psychiatric aides at the Institute now have their Bacculaureate degree, and this newest development is the fourth phase of an educational program for personnel at the Institute which already includes advanced study for physicians leading to the degree of Doctor of Medical Science, a postgraduate course in psychiatric nursing and a post-collegiate course for psychiatric aides.

MEDICAL SOCIETY OF ST. ELIZABETHS HOSPITAL.—The Medical Society of St. Elizabeths Hospital held its first annual dinner on April 14, 1938, at the Kennedy-Warren Hotel, Washington, D. C. Dr. Winfred Overholser, recently appointed superintendent of the hospital, and Mrs. Overholser were the guests of honor; and Dr. Cloyd Heck Marvin, president of George Washington University, was the invited speaker of the evening. Among the guests were three former first assistant physicians of the hospital: Dr. Ross McC. Chapman, Dr. Arthur P. Noyes, and Dr. H. C. Woolley.

Tribute was paid by Dr. Overholser to his predecessor, the late Dr. Wm. A. White, and it was announced that a painted portrait of Dr. White, now on view at the hospital, would probably soon be purchased and presented to the institution by several of his admirers.

The Society, through its president, Dr. A. M. Duval, tendered to the new superintendent an expression of its loyalty to, and support of, his administration, and Dr. Overholser, in return, expressed gratitude for the welcome he had received from the profession in Washington and from the community as a whole.

The Medical Society of St. Elizabeths Hospital was organized last year as an alumni society of the institution and is composed of present and former members of the medical staff. Included in membership are members of the various government medical services—Army, Navy, Public Health Service and Veterans Administration—

who have received their psychiatric training at St. Elizabeths Hospital. Correspondence is invited from physicians who have previously served at the hospital and who are interested in learning more about the aims of the Society. Letters should be addressed to Dr. Jay L. Hoffman, Secretary, St. Elizabeths Hospital, Washington, D. C.

FIFTH EUROPEAN MENTAL HYGIENE REUNION.—The fifth European Congress is scheduled to be held at Monaco, August 22 and 23, 1938. The principal subjects which will be discussed are, (1) The Mental Hygiene of Marriage, (2) Alcohol and Drug Addiction, (3) Occupational Therapy. Opportunity will be afforded on August 24 and 25, for those attending the reunion to visit the more important scientific, welfare and treatment institutions of Monaco.

FIRST INTERNATIONAL CONGRESS ON LEGAL AND SOCIAL MEDICINE.—This Congress will be held at Bonn, September 22 to 24, 1938. Information concerning the Congress may be had by addressing Professor F. Pietrusky, director of the Institute of Legal and Social Medicine of the University of Bonn, 52 Theaterstrasse.

Book Reviews.

DIE EPILEPSIE DES KINDESALTERS. By *Eugen Schreck*. (Ferdinand Enke, Stuttgart, 1937.)

The original intention of the investigation undertaken by Dr. Schreck was to determine the relative frequency of the appearance of "genuine epilepsy" and "symptomatic epilepsy." He found that the great majority of cases of epilepsy was not genuine, but symptomatic. He also came to a further conclusion that it is no longer feasible to divide epilepsy into a "genuine" and "symptomatic" form, but that a third group must be differentiated: that of "symptomatic epilepsy in children tainted with hereditary diseases."

The author's material consists of 330 patients who were under observation in the Children's Clinic in Tübingen from 1919 to 1935. For the most part, the children came to the clinic on the occasion of their first attack and the course of their illness was then followed further. In the clinical pictures of these cases the following differences were found. The symptoms which characterize "genuine" epilepsy reflect the whims, unpredictability, changeableness and many-sidedness of the hereditary inferior brain. Vice versa, the clinical manifestations of "symptomatic" epilepsy are determined by the organic localized brain lesion. They correspond to the disordered functions of the central nervous system and are characterized by an unmistakable regularity and uniformity, occasionally by a steady increase in the severity of the clinical picture.

The division of epilepsy into "genuine" and "symptomatic" on the basis of the old concepts, that is, by the exclusion of organic symptoms, is not an adequate method, but one has been content with the designation of a "genuine," "essential," "idiopathic," "functional," or "dynamic" epilepsy. These are all opposed to the group called "symptomatic." Actually, there is a third group, that of "symptomatic epilepsy from hereditarily tainted families." This Schreck makes into:

(1) pure genuine epilepsy with proof of hereditary taint,

(2) pure symptomatic epilepsy, exclusively acquired by organic brain injury,

(3) symptomatic epilepsy with, at the same time, proof of hereditary taint.

Of group (1) there were 26 cases out of the total 330 studied; group (3) contained 89; the remainder, 215, comprised group (2) the "symptomatic epilepsies."

It seems to the reviewer that this work is important, for it defines what one means by "genuine" or "idiopathic" epilepsy, *i. e., hereditary* epilepsy. Thus one no longer has to use the vague and meaningless words. Epilepsy is seen clearly for what it really is, a *symptom* of some underlying disorder, be it heredity, inflammation of the brain, cicatrix, or any one of the many causes of fits.

STANLEY COBB.

THE PROFESSIONAL THIEF. By A Professional Thief; annotated and interpreted by *Edwin H. Sutherland.* (Chicago: University of Chicago Press, 1937.)

This is a very interesting book for those who are factually minded and who like their material presented without too much adulteration with theory and subtle psychological analysis. The *modus operandi* of professional thievery is detailed with what appears to be a photographic reality. The techniques, including the relationship with the forces that are supposed to suppress thievery, is given with just about the same dryness of style that an institutional head would use to describe the working of the various departments in his organization. There is no attempt made to sentimentalize the situation. One does not get the feeling that the professional thief is a victim of society. We are merely shown *how* as a professional man he carries on his profession, which is as it should be for the mature student of criminology. He can supply emotion and psychological analysis, since the thief himself is certainly in no position, even with the best of intentions and greatest of skill, to do so.

The fact that stands out is that there is a sort of sociological ecology operating in the case of the professional thief and of crime in general. Circumstances and character create the professional thief. He works in a framework in which he comes in contact with the law. The law both punishes and at the same time through the bribery of its individual members shelters and protects him. In other words, the law is seen not as an abstract force but as made up of individuals who, coming in contact with the opportunity to make money, do so in a directly professional way. Thus, it becomes part of the profession of many policemen and other officials to make money out of the professional thief, just as it is their duty to suppress him. This has all been beautifully pointed out by Walter Lippman in his more or less theoretic articles on crime and criminals, and the reviewer has also attempted to demonstrate this in a publication of his own. But here we have first-hand information not only of the fact but of the technique by which the fact becomes a matter of great importance to society.

The reviewer highly recommends this book to those who are interested in crime as a social phenomenon and who attempt to view the situation without any ideologic bias.

A. MYERSON.

FREUD AND MARX. By *Reuben Osborn.* (New York: Equinox Co-Operative Press, 1937.)

In the introduction to this book written by John Strachey, one reads that while the author has not solved the problem of the relationship of Marxism to psychoanalysis, "his splendid service is that he has propounded it." It is the reviewer's impression that the author has been distinctly unfelicitous. Some of the more extravagant of Freud's speculations and some of the more extravagant of the communistic statements are combined in what can scarcely fail to be an annoying document perhaps intended to show "why psychoanalysis is of such importance to the Communists who have yet to make their

revolutions." Chapter VI begins with the following: "The best point of departure for a study of the relationship between Freudian and Marxian theories is a consideration of primitive society, for here they have much in common." The word "hypothetical" might well have preceded "primitive."

The student of human personality needs the political scientist; the student of government and the student of social organization need the psychiatrist. Two formulations as significant as that of Freud and that of Marx cannot properly remain the respective preoccupations of experts who learn nothing from each other. It is to be hoped that collaboration, when it appears, will proceed along a somewhat different line than that followed by this writer.

H. S. S.

To Drink or Not to Drink. By *Charles H. Durfee, Ph. D.* (New York, Toronto: Longmans, Green and Co., 1937.)

This is a discussion of an old problem from a modern point of view, and as the result of a good deal of practical experience in readjusting "problem drinkers." Dr. Durfee prefers the term "problem drinkers" to "alcoholics" for the reason that the latter term may or may not include those to whom the use of large amounts of alcohol becomes a problem.

Many ardent "temperance" advocates feel the problem can be solved by prohibition in one form or another. To them the excessive drinker is not so much a psychopathic problem as a moral blot on the landscape who must be reclaimed by some form of compulsion. The idea of compelling these "temperance" people to read at least the first chapter of Dr. Durfee's book is attractive but no doubt such compulsion would no more change their point of view than do the various compulsory or restrictive cures provide the drinker with a permanent solution of his difficulties. The interests of the temperance people are broader than those of Dr. Durfee. They are interested in all drinking, while his interest extends only to the problem drinker who is to be distinguished, he says, "not so much by the quantity he drinks on occasion, or over a period of time, as by the degree to which his drinking has become a personal and social problem to him."

When it is possible, the problem drinker comes as a guest (not as a patient) to Dr. Durfee's farm and here the therapeutic work is carried on. Not all who apply are taken; "Unless a desire for change exists or can be aroused in a problem drinker, therapeutic effort will be unavailing." If this condition is met, the drinker joins the farm group and the work of rehabilitation begins. A description of the farm and its accommodations is given and a very attractive life it seems to offer. The keynote is freedom rather than restriction and the patient is invited to "taper off" rather than suddenly to give up all alcohol. Practically all the work of the farm is done by the patients themselves and it apparently requires no great effort on the part of the director to get them interested. This is understandable when one considers the interests offered by farm work as compared with the somewhat artificial interests of "ocupational therapy" provided in urban institutions.

The cure involves a number of factors—the services of a physician in connection with any unhealthy physical conditions, the free and healthy environment conducive to physical and mental welfare, interesting and satisfying work, conversations and associations with the therapist, freedom from old associations while the readjustment is made, the sense of responsibility and freedom from absorption in self due to the attitude of older patients that they must be of assistance to the newcomers. Dr. Durfee does not aim at a cure which will later permit the problem drinker to use alcohol in moderation. He must accept the fact that liquor is not for him and even if completely readjusted must regard even the smallest quantity as too apt to set up earlier and harmful associations.

A chapter is devoted to the treatment of drinkers who are unable to become guests at the farm. This is a more difficult affair since many of the helpful agencies are lacking and there are present many influences in the way of relatives, friends and associations which often work against the patients' efforts towards reeducation.

The chapters, "The Need for Emotional Training" and "Educational Measures," point the way towards measures which may be effective generally in making the consumption of alcohol less of a problem. They are interesting and suggestive although there seems to be a certain lack of logic in the author's belief that children from nine to twelve be given the facts about alcohol as being at the most receptive age. This direct and didactic method scarcely seems to follow from the earlier chapters which make it clear that success can be expected only from methods which must be described as indirect.

The book has the merits of brevity, readability and a bibliography (but no index) and all in all can be recommended very heartily to those interested in, or in need of, a discussion of the subject.

H. B. SPAULDING,
Toronto.

CHEMISTRY OF THE BRAIN. By *Irvine H. Page, M. D.* (Baltimore: Charles C. Thomas, 1937.)

This excellent book, which supplies a long-felt want, should be welcomed by both psychiatrists and biochemists. The colossal task of reviewing the chemical literature pertaining to brain right from the earliest work of Fourcroy in 1793 up to the end of 1936, has been done in a masterly manner by one who is not only competent to do it but who has done it (if one may judge from the tenor of the text), not under any form of compulsion but as a labor of love. The book is unique in several respects: the opening chapter describes the genesis of brain chemistry by giving an entertaining account of the life and work of that neglected and misunderstood genius, J. L. W. Thudicum, and the closing chapter consists of a thought-provoking philosophical consideration of the brain as the seat of the mind and of thought. Between these two short, but very interesting chapters, one finds a wealth of chemical information which has been carefully collected and thoughtfully

arranged. Not only are the facts stated, but an intelligent discussion of their interrelationships and significance adds much to the value of the book. Interesting speculations and numerous suggestions as to special phases of brain chemistry requiring further study reveal the author's active imagination to be guided by a keen sense of synthetic as well as analytic logic.

Four chapters deal with the lipids. These compounds, which exist in brain in proportions far in excess of that in other organs, are usually dealt with rather briefly in most biochemical textbooks, so the author discusses their chemistry and what is known of their metabolism in some detail. This section of the book, dealing with a field in which Dr. Page has done considerable work himself, is particularly well written. Forty pages are devoted to the sterols, 50 pages to the phosphatides, 31 to the fatty acids and five to the cerebrosides.

The carbohydrate and nitrogen metabolism of the brain are then considered at some length, followed by a section on electrolytes and gases. Thirty pages are devoted to the physical chemistry of the brain, and 13 pages each to the brain enzymes and to comparative neurochemistry. Gaseous metabolism of brain under various conditions is dealt with in 26 years and 20 pages are devoted to the effect of diet (particularly vitamin deficiencies) upon the brain. Dr. J. H. Quastel has contributed a valuable chapter upon oxidations in the brain.

While the type of the text is very readable that of some of the tables and diagrams is rather lacking in clearness. Structural formulæ in particular, have caused the type-setter some trouble. It is unfortunate that such a great variety of types have been used for the formulæ, some being half as large again as that used for the section headings, others being almost microscopic. A few misprints have evaded the proofreaders but they are obvious and do not affect the sense, *e. g.*, the misspelling of Reineckate on p. 67, the omission of a "1" from the year of the second reference on p. 80, the transposition of letters in the word "syndrome" on p. 92, the incorrect linkage of the ureido and guanidino groups on the δ-carbon atoms of citrullin and arginine, respectively, on p. 199, etc. These slight blemishes are unfortunate, since they tend to distract one's attention from the excellence of the book as a whole.

C. C. Lucas, Ph. D.,
University of Toronto.

The Principles and Practice of Clinical Psychiatry. By *Morris Braude, M. D.* (P. Blakiston's Son & Co., Philadelphia, 1937.)

For some years the reviewer has carefully read the new textbooks of psychiatry hoping to find one that was ideal. Hence this volume has been studied critically and carefully. The conclusion is that it is a brief, readable book with a fair discussion of the principal types of mental disorders, that there is nothing new or outstanding as compared with other textbooks, and that the book is, in many places, hurriedly and carelessly written. The reviewer concludes, therefore, that it is not as good a textbook of psychiatry as a number that are now in general use.

If specific criticisms are to be made, the following seem sufficiently important to mention.

1. The author states that the book is for general reading and not merely for medical students. Yet the whole style of the book and the actual material is such that only a medical student could read it understandingly. For example, there are very elaborate discussions of differential diagnosis, there is the constant use of terms which only medically trained persons could possibly understand. Even then references are made without adequate explanation. To cite a specific instance: In discussing the predisposing causes of dementia præcox, the author states, "Kretschmer demonstrated a correspondence between certain psychoses and somatic types. The greatest number of schizophrenics occur in 'asthenic,' 'athletic,' and 'dysplastic' and the manic depressives in the 'thymic' persons." Leaving out the use of "thymic" for "pyknic," the reviewer would question the value of a reference of this type. The majority of readers will have no concept of the meaning of these terms. It is doubtful if most physicians could give any clear explanation of Kretschmer's theories. A brief explanation of the meaning of these terms should have been included.

2. There are many statements which are obvious and seem unnecessary. To state that "Flagrant memory defects call for thorough investigation of the whole patient" or, when discussing the treatments of complications in manic depressive psychoses, to state that "pulmonary tuberculosis and pyelonephritis call for adequate treatment," (to cite but two examples) seems to add nothing of value, particularly when one reads the chapter on dementia præcox and does not find pulmonary tuberculosis discussed as a complication.

3. In the chapter on dementia præcox we are told on page 59: "Alcoholism and Schizophrenia—their combination is as interesting as it is common." The inference from this would be that alcoholism is very common in schizophrenia, whereas such is not the case. In discussing the symptomatic treatment on page 63, we find this statement: "Only the mildest drugs consistent with safety should be used only when indicated. Of these, amytal or phenobarbital are safest. Opium in small doses may be given but atropine or the alkaloids akin to it, only very cautiously." On page 89, in discussing the treatment of the manic depressive psychoses, we are told: "Under no circumstances should opium and its derivatives be used. When injudiciously employed, there is great danger of forming the opium habit which is worse than the disease for which it may be intended." It is rather difficult to reconcile these two statements. In discussing the "curative" treatment of dementia præcox we find among other things the mention of dinitrophenol (with caution). Also the statement: "The use of carbon dioxide subcutaneously to produce temporary contact has been tried. Insulin given with great care with or without diabetes may be tried." Finally we are told: "Lastly there is a method which should be utilized cautiously and with a full knowledge of its limitations. This is deep analysis. It is ineffective because there is no rapport nor can be between patient and analyst, and furthermore, in cases in which it has been tried, the condition was made worse." Certainly to mention dinitrophenol as

a cure for schizophrenia, when it is now recognized as a thoroughly dangerous and unsafe drug, and when there has never been any real evidence of its curative value, must be condemned. The use of carbon dioxide subcutaneously leaves the reviewer puzzled. The inhalation of carbon dioxide mixtures is well known and there has been some quite unconvincing work on the use of oxygen subcutaneously, but the reviewer is unaware of any work demonstrating the value of carbon dioxide subcutaneously. Finally, why should one advocate that a method should be "utilized cautiously" and then follow it up with a statement that it is ineffective, explaining why it cannot help, and then go on to state that where it has been tried the condition has been made worse. Such a contradiction seems to have no place in a textbook of psychiatry.

4. In the chapter on Manic Depressive Psychosis, we are told on page 70: "Manic depressive psychosis is an endogenous, functional, non-deteriorating mental disease . . . . ," whereas on page 86, in discussing some of the depressions, there is the statement "Some recover completely, a great many more do not," and still further down: "Of course if the malady shows no abatement after a few years, intellectual deterioration of varying degree supervenes unless the victim has previously killed himself." It is also stated that the manic depressive psychosis "is a disease of youth." Here again the general statistics on this subject would hardly indicate that this is a disease of youth. On page 82 it reads as follows: "Diagnosis—The student should first of all understand that this disease is not a figment of the psychiatrist's imagination, as some allege, but a grim reality measured in countless aching hearts, broken ties and fortunes, and wrecked reputations." The reviewer was unaware that there was any general idea that the manic depressive psychoses were" a figment of the psychiatrist's imagination."

5. In the discussion of the senile psychosis, there is no clear distinction made between senility and arteriosclerosis. The statement is made that the term "arteriosclerotic dementia" is given as a synonym for senile psychosis. We are told that the "commonest endogenous predisposing cause is a heritage of poor 'vital rubber.'"

6. Under the heading "Mental Disease from Head Injury," the author states on page 149: "There is, properly speaking, no such clinical entity as traumatic psychosis." On page 150 we are told: "Cranial injury as the sole cause of mental disorder must also be granted." Following this, there is given an illustrative case in which an individual, who was considered perfectly normal, deteriorated as a result of head injury, the last sentence of the case presentation stating: "A man of normal emotions and intellect has changed to one of imbecility as a direct result of injury to the head." In discussing the treatment of traumatic psychoses, there is no mention made of the necessity of keeping the patient absolutely quiet in bed for several weeks nor of hypnotic drugs either as valuable or as dangerous, and the discussion of treatment can hardly be regarded as satisfactory.

7. The discussion of alcoholism does not seem very satisfactory. The different types of alcoholic psychoses are not clearly distinguished. One is given a somewhat confused picture of the different alcoholic symptomatology.

Restraint and hot packs are advocated for the treatment of delirious and maniacal alcoholics, but nowhere is the question of the alcoholic polyneuritis being due to a vitamin B-1 deficiency brought out, nor is there any suggestion of its use for treatment.

8. In the treatment of lead encephalopathy, it is not made clear that the treatment is to bind the free lead by giving such drugs as calcium, and that endeavors to eliminate lead or carry out the routine treatment of lead poisoning is the worst possible thing to do. Many psychiatric hospitals have had cases of lead encephalopathy sent from general hospitals when the deleading process has been carried out too rapidly, and too much lead thrown into the system has produced the irritation of the nervous system.

9. Chapter 7 is entitled "Food Deficiency in Mental Disease," and starts out with a discussion of avitaminosis. This discussion is rather disconnected and would hardly give anyone who was unfamiliar with the subject any clear or adequate picture. The one case history presented is that of scurvy, and here again there is no mention made of the polyneuritis in alcoholics being due to a deficiency of Vitamin B-1.

10. On page 256, under the chapter on Psychoneuroses, we are told that "psychoanalysis, interesting enough, was first conceived simultaneously by Breuer and Freud while studying hysteria and hypnosis under Charcot." Again on page 288 there is reference to "Breuer and Freud, pupils of Charcot." Finally, the chapter on Psychoanalysis is quite poor and many of the statements seem to get nowhere. For example, on page 342: "Its opponents, because of ignorance or perverseness, sometimes speak of it as sheer nonsense, but as it is a method, instrument or tool in research, it assuredly cannot be called nonsense however fanciful or mystic the conclusions may be." On page 343, there is the reference to man as a psychobiological unit, as if this were a concept of psychoanalysis, whereas the very term itself has been coined by Adolf Meyer and is tinged with all the implications of his psychiatric theories. We are told "To enhance the student's interest in the story of psychoanalysis, a few words that led to its present form are in order." Without trying to parse this sentence, one can proceed further and a few sentences later come across the following:" The modern, almost ritual-like practice of psychoanalysis and its excursions into the realm of deductive reasoning from established mental facts date from the year 1885 when two young Viennese medical men, Josef Breuer and Sigmund Freud, keenly interested in applied psychology, repaired to Paris to continue their researches under Charcot." On page 356 we are told "Sexual perverts should not be analyzed because of the danger of setting up a negative transference and of the consequential unsavory repercussion." On page 357: "Although indicated, positive transference in ill advised cases, as in single women, may be productive of scandalous situations from an idealistic platonic affection or demand of physical love and may alternate with a most violent hate." On page 360: "It is contra-indicated in the major psychoses because of the impossibility of establishing a rapport and in sex perversions because of scandalous implications."

11. The chapter on Mental Deficiency brings out the difficulties in the use of psychometrics. On page 334 we are faced with the startling statement:

"It is estimated that about one-half of all the inmates of colonies for the feebleminded are psychotic." On page 335 the author leaves one hopelessly confused in talking about differential diagnosis between the higher imbeciles and the feebleminded proper, and to the distinction between the moron and the feebleminded. Apparently the author is confused by the use of the term "feebleminded" as employed by some of the English writers, and the manner in which the term is used in this country, although on page 327 he states with regard to classification: "The one used in the text is that suggested by the American Association for the Study of the Feebleminded." There is then the following statement: "Barr's classification includes in imbeciles those of a mental age of approximately 4 to 12 years." This discussion will certainly leave the uninformed completely confused. Alcoholism, syphilis, and consanguinous unions are given as the most important factors "in the primary plasmic types."

These examples are cited as illustrative of many more similar statements and form the reviewer's basis for concluding that the book is hardly a satisfactory textbook for medical students or a suitable book for the general public.

KARL M. BOWMAN.

THE 1937 YEAR BOOK OF NEUROLOGY, PSYCHIATRY AND ENDOCRINOLOGY. Edited by *Hans H. Reese, M. D., Harry A. Paskind, M. D., Ph. D., and Elmer L. Sevringhaus, M. D.* (Chicago: The Year Book Publishers, 1937.)

Current progress in the interrelated fields of neurology, psychiatry and endocrinology is presented with customary thoroughness in The 1937 Year Book, representing 518 contributions selected from 110 American publications and 20 periodicals from other countries.

The Year Book series is so well known as not to require description beyond reference to some of the outstanding features of the present issue.

In his introduction to the section on neurology Dr. Reese comments upon the increasing stress upon biology, electro-physics, biochemistry and pharmacology in explaining the functions and dysfunctions of the nervous system and the processes which are called mental. Particular attention has been directed to the anatomy and physiology of the vital centers in the diencephalon and to the correlation of these findings with clinical observations.

In view of the unfortunate popularization of vitamin deficiency as a diagnosis the reader will welcome the orientation which a dozen or so of the significant contributions of the year can supply.

The most conspicuous psychiatric question of the year has undoubtedly been that of the insulin shock treatment of schizophrenic syndromes. All aspects of this work, still in its experimental stages, are reviewed in the present volume, including synopses of reports of results from the United States, the British Empire, Germany, Switzerland, The Netherlands and Poland.

The comparatively new field of child psychiatry is represented by several reviews in a subdivision.

The scheme of endocrine interrelationships as presented in previous volumes in this series remains unchanged; and under the heading of the pituitary group are discussed the functions of the thyroid, parathyroid, mammary glands, pancreas, adrenals and sex glands. A notable accomplishment has been the improvement in the treatment of diabetes by the use of protamine insulin, the 1937 reports amplifying and confirming the favorable ones of 1936.

The 1937 Year Book maintains the excellent traditions of this series. It is well indexed and contains 110 illustrations.

C. B. F.

In Memoriam.

SIR JAMES CRICHTON-BROWNE.

1840–1938.

A great British psychiatrist has been removed by death. Sir James Crichton-Browne was one of the most remarkable personalities of his time. From the summit of his years he could look back over a period embracing most of the modern developments in the care of the mentally ill in the British Isles, in which he himself had so large a part.

By the kind permission of the editor of *The Lancet* we reproduce the following memorial notice which appeared in *The Lancet* for February 12, 1938:

Sir James Crichton-Browne died at his home in Dumfries on January 31, at the age of 97. His vitality and perpetual youth, which were the admiration and envy of his colleagues, proved inadequate to withstand the shock of the death of his son last October.

James Crichton-Browne was born at Edinburgh in 1840, the son of Dr. W. A. F. Browne, a commissioner in lunacy for Scotland, and was educated at Dumfries Academy, at Trinity College, Glenalmond, at Edinburgh University, where he was a pupil of Lister, and at the University of Paris. He qualified L. R. C. S. Edin. in 1861 and M. D. in the following year, and became medical officer successively at Derby, Devon, and Warwick county asylums, and medical superintendent at Newcastle borough asylum. In 1866 he took charge of the West Riding asylum at Wakefield, where his clinical and pathological investigations in neurology paved the way for the later researches of Ferrier, Hughlings Jackson, and Horsley. Here he founded and edited the "West Riding Asylum Reports," the first British journal of neuropathology. In 1875 he left Wakefield on being appointed Lord Chancellor's visitor in lunacy, a post he held until 1922. For nearly 50 years his advice was thus available to the Court of Chancery through the Master in Lunacy about the comfort and supervision of the wards and the proper allocation of their estates.

He was one of the first and most inspiring advocates of the early treatment of threatened mental breakdown as an essential first-aid in mental illness, which the Mental Treatment Act of 1930 has brought within the reach of both rich and poor. He urged the necessity of the study of childhood as affording the best key to the interpretation of early mental symptoms, and his thesis published in 1883 in Malcolm Morris's "Book of Health" is still the standard authority on the relation between education and the nervous system. In the following years he successfully aroused public opinion against over-pressure in elementary schools and the principle of payment by results.

In 1886, when he was knighted, *The Lancet* said "he has well won his spurs as a scientist, and will wear them not only worthily but with the esteem of his profession." In 1883 at the proposal of Charles Darwin he had been elected a fellow of the Royal Society, and in 1889 he became treasurer of the Royal Institution, at the meetings of which he was for long a prominent figure. He was given honorary degrees by the universities of St. Andrews, Aberdeen, Leeds, and Edinburgh, and was president at various times of the Medical Society of London, the Neurological Society, the Medico-Psychological Association, the National Health Society, and the Sanitary Inspectors' Association. He was one of the founders of *Brain* and edited the journal for a time with Hughlings Jackson and David Ferrier.

His official duties, which necessitated much travelling about the country, would have monopolized the energies of most men, but did not prevent him from interesting himself in other subjects—he took part in a controversy with Froude about the relations of Carlyle and his wife. But his main fields were those of mental and nervous disease and public health. He held strong views against teetotalism and maintained that no writer had done much without alcohol. He disagreed with the Psalmist's three score years and ten; by using common sense and avoiding fads everyone, he said, should live to a hundred. With advancing age his energies were amazingly retained, and since 1930 he had published five volumes of reminiscences, of which his "More Leaves from a Doctor's Diary" appeared last October, besides speaking of his experiences and propounding his philosophy on the wireless. His Dundreary whiskers, the last of their kind, his courtly manners and rounded phrases brought us a glimpse of the Victorian era at its best.

Sir Robert Armstrong-Jones, who was his colleague for the last 10 years of his official life as Lord Chancellor's visitor, says of him: "He was a man of wide reading, accurate thought, and clear expression, as well as of marked literary culture and ability. In a controversy his weapon was the invincible spear of sound reason, which characterized all his arguments. He was an especially gifted orator, and indeed one of the best after-dinner speakers in our day. He was eloquent, clear, decisive, and well-informed. He possessed a mind of no ordinary intellectual powers, strengthened by an excellent memory. He never spoke except with the dignified and graceful authority of a supreme master of his subject, and he was listened to with riveted attention, admiration, and respect, more especially when pleading the cause of the mentally ill and the men and women who succor them. The amount of time, labor, and scrupulous attention he devoted to the care and treatment of the most afflicted of suffering humanity was immense. Nor did he overlook the material comforts of those under his care. His patients reposed implicit trust in his courteous vigilance as a guardian of their welfare, and after his retirement would often recall his deeply felt understanding and sympathy, and his generous and real friendship."

Sir James's first wife was the daughter of Dr. Halliday, and died in 1903 leaving him with a son and a daughter. In 1912 he married Audrey Emily, daughter of Sir E. Bulwer and niece of Bulwer Lytton. His son, Colonel Harold W. A. F. Browne, the explorer, died in October, 1937, at the age of 71.

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PROCEEDINGS OF THE 89TH MEETING OF THE
SWISS PSYCHIATRIC ASSOCIATION
AT MÜNSINGEN, BERNE, MAY 29–31, 1937

THE TREATMENT OF SCHIZOPHRENIA
INSULIN SHOCK · CARDIAZOL
SLEEP TREATMENT

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SOLOMON KATZENELBOGEN, M.D.
WITH COLLABORATION OF
FREDERICK SANTEE, M.A. (OXON.)

THE AMERICAN PSYCHIATRIC ASSOCIATION extends its sincere thanks to the Editors of the Schweizer Archiv für Neurologie und Psychiatrie for permission to print as a supplement of the American Journal of Psychiatry the translated papers given at the Symposium on the Insulin and Cardiazol treatment of schizophrenia held at Münsingen, Berne, May 29-31, 1937. We acknowledge particularly the cordial assistance extended by Dr. Hans Maier, of Zürich.

Responsibility for translation and editing was undertaken by Dr. Solomon Katzenelbogen, of the Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital. For this arduous and time-consuming task we are very grateful.

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ROSS MCC. CHAPMAN.

EDITORIAL NOTE

This supplement to the May issue (Vol. 94) of the American Journal of Psychiatry contains all the papers and communications which were presented at the 89th meeting of the Swiss Psychiatric Association held May 29-31, 1937, at Münsingen, Berne. Sixty-six papers in German, French and Italian and two in English were published in the Schweizer Archiv für Neurologie und Psychiatrie as a supplement to Vol. 39.

For technical reasons (in the reproduction of the original plates), in a few charts some of the text was not translated. However, the titles of the charts and the references to them in the papers adequately explain their content.

S. K.

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1. ADDRESS OF THE PRESIDENT OF THE SWISS PSYCHIATRIC ASSOCIATION

DR. FLOURNOY, GENEVA

I extend a welcome to you all, especially to the Honorable Mr. Mouttet, Director of Public Health. The presence in our midst of a member of the government of Berne is especially gratifying to us. Professor Mouttet has always given to physicians testimony of his great good will and proof of his perfect comprehension of the problems that face them.

Professor Dürst, Rector of the University of Berne is also kind enough to attend this inaugural session. We are very grateful to him, and I may assure him that our Society attaches great value to the support and encouragement it meets among the University authorities.

The discussion of insulin has attracted to Münsingen a large number of foreign psychiatrists. This is a very unusual occurrence. For three whole days we shall have the pleasure of listening to reports, the quality of which, I am sure, will not fall below their quantity. I also wish to congratulate our guests who have come from a dozen countries of Europe and America and to tell them how happy we are to be able to benefit by their scientific collaboration. My congratulations are due also to Dr. Müller who will present in a very comprehensive paper the results of his splendid research and who has made careful preparations for this meeting with the help of Dr. Braun of Zürich, the indefatigable Secretary of our Society.

I wish to express my personal gratitude to Dr. Braun and Dr. Müller as well as to my colleagues on the committee. For I have just returned from a long journey abroad and have taken no part in the practical organization of our meeting. To them, therefore, belongs all the honor for the accomplished work for which I am going to share the reward with them today. I only regret that Dr. Brauchli, the Director of the Münsingen Clinic, has been prevented by ill health from attending this session. I shall extend to him, in the name of all of you, our best wishes.

In closing, permit me to thank the firms Novo of Copenhagen and Sandoz of Basel for their generous contributions to the recreational program of this congress.

I hereby declare the 89th meeting of the Swiss Psychiatric Association open.

2. ADDRESS OF THE HON. PROF. H. MOUTTET [1]

In my capacity as Director of Public Health of the canton of Berne and in behalf of Dr. Brauchli who has been prevented by illness from receiving you in the institution which he directs, I consider it a pleasure to extend our welcome to you. I address my greeting to the members of the Swiss Psychiatric Association as well as to the distinguished gentlemen who have come from beyond our borders to pay us the honor of their presence.

Your Association meets twice a year, to settle administrative matters or to examine the innovations with which certain establishments have been endowed and from which you may derive benefit. But the principal object of your meetings is to study certain scientific problems that concern your specialty. On this occasion your meeting is unusually large because of the subject you have chosen for study, the therapy of schizophrenia. You have 42 papers on the day's program. I do not intend to add to the list. I shall take the liberty, however, of pointing out that the new therapeutic methods in schizophrenia are naturally very interesting to the public authorities.

The state should in varied forms concern itself with human suffering and misery. Sickness leads in its wake invalidism, hospitalization, poverty,—scourges which must be combated because they jeopardize the common weal of society. The immense crowd of abnormal and defective patients who are hospitalized puts an enormous burden on the healthy population, and imposes heavy sacrifices on the state. The cost of asylums for the insane and of public assistance assumes disturbing proportions The discovery of therapeutic methods permitting cure or even only improvement of schizophrenic patients would have happy consequences for the patients and for those who support them, their relatives, their towns, and the state. A number of otherwise useless

[1] Director of Public Health, Berne.

or even dangerous, individuals would be restored to life in the community. Our institutions would be emptied of a goodly portion of their patients and our expenses for hospitalization and relief would be diminished to a considerable degree.

You will excuse me for demeaning the results of your labors, in setting them down in the language of bookkeeping. I do it to show you that your meeting cannot leave public authorities indifferent. This aspect of the problem is the one which interests you the least because your activity is pre-eminently scientific. You assemble work that has been done in scattered fashion; you coordinate the data gained by experiment; you seek to avoid blind groping and errors; you provide the occasion for new discoveries, and, finally, you make contributions to the development of human personality, the supreme goal of civilization.

If your visit to Münsingen leaves you the impression of a well-organized, well-directed institution, it is due to the devotion and labor of its staff, the initiative and zeal of its heads, especially of its director, Dr. Brauchli, who in a few days is going to celebrate the 40th anniversary of his service with the State of Berne. I take this occasion to express publicly to him in the presence of his fellow scientists the profound and sincere gratitude of the government of Berne.

If you carry away from your meeting good and valuable memories, you will owe them to the patient labors and the scholarly studies of the foreign and Swiss psychiatrists who have met here to offer you the fruits of their researches and meditations. Let us thank them for having given such magnitude and such brilliance to a matter that concerns not only the science which you cultivate but also the public authorities who will derive from your discussions the hope of curing certain mental diseases, and consequently of decreasing the costs which weigh so heavily on the shoulders of the people.

I shall express my thought in a less utilitarian manner by saying that we, officers of the state who are concerned with the prosperity, the health and the well-being of our fellow citizens expect from you the transformation of useless human beings into individuals useful to society. For this reason I bring you our thanks, in advance, and the patriotic greeting of the government of Berne.

(I) PROCEEDINGS OF SATURDAY, MAY 29, 1937

3. THE INSULIN THERAPY OF SCHIZOPHRENIA

INTRODUCTORY PAPER BY M. MÜLLER[1]

A year and a half ago when I had the opportunity, at this very place, to present a report on our early experience with Sakel's insulin treatment, my statements were not received without a considerable mixture of feelings. Numerous objections and even some warnings were voiced. Most of these, to be sure, concerned the great dangers which supposedly are connected with this new method, but—as we can frankly admit today—they were also based on that mistrust which exists in some quarters of our profession in regard to the high remission rates that have been reported from Vienna. Indeed, systematic control studies of Sakel's procedure had not yet been made at that time, and my own material was still too inadequate to allow any safe conclusions.

Since then, however, the situation has changed definitely. In most civilized countries, numerous reports have been published on the basis of further investigations, and, as we shall learn presently, Switzerland has made some of the most valuable contributions in this connection. Poland, too, deserves special credit. It was one of the first countries to introduce Sakel's method. This was done particularly by Rosé and his collaborators at Wilno, and by Frostig at Warsaw. In Budapest, the insulin treatment had been utilized by Bendek even before Sakel's Monograph had been published. Two other Hungarians, v. Pap at Debrecen and v. Angyal at Budapest, also worked with this method. In Jugo-Slavia (Zagreb), extensive evidence has been collected by Berglas and Susic. Somewhat later, the insulin therapy found its way into Germany, where Ederle was the first to report on the control studies carried out in the clinics of Tübingen and Giessen. Since then, Sakel's method has been in use in many German clinics and institutions, especially by Roemer and Küppers at Illenau and by

[1] Cantonal Institution for care and treatment, Münsingen, Berne. Dr. U. Brauchli, Director.

v. Braunmühl at Eglfing. In Moscow, Kronfeld has just completed the treatment in a large number of cases in an institute that was especially established for the insulin therapy. Careful investigations are being carried on by Claude and Rubenovitch at the psychiatric clinic at Paris. In Italy, Accornero and Bini at the psychiatric clinic in Rome, and Tomasini and Grimaldi at Fermo, among other investigators, work with Sakel's method. Strecker of Edinburgh was the first to introduce it into England, and Gjessing and Langfeldt (Oslo) into Norway. In the United States, since last summer, the insulin treatment has been utilized in a score of hospitals throughout the country, partly under Sakel's supervision. Finally, reports dealing with a small number of cases have been received from Belgium, Holland, Latvia, Greece and Japan. All in all, the reported material includes over 2,000 cases, which have been treated with this new method.

Thus, the literature on Sakel's treatment of schizophrenia has reached considerable proportions. A survey of it would have to refer to the numerous investigations on related problems in physiology, humoral pathology, neurology, and psychopathology. This is neither the object of my introductory remarks, nor could it be done because of time limitations. Besides, I feel the more justified in foregoing this task at present, as I have compiled such a review recently.[1] Moreover, our present conference with its large number of discussions will certainly give us a chance to learn practically everything that has been found out so far with regard to Sakel's insulin treatment and the individual problems that are connected with it.

I should like to consider, instead, those problems that have been foremost in the minds of our critics, and which even today constitute the chief concern among the majority of our colleagues: the therapeutic value and the dangers of the insulin treatment.

Now, in trying to get a true picture of the value of our new method, it would seem that the simplest way is to collect and compare all of the statistical information that has been reported so far. This procedure, however, does not lead to any valid results in our case, because of the fact that the different investigators have not

[1] Fortschritte der Neurologie, Psychiatrie und ihrer Grenzgebiete. IX. H. 4. 1937.

used the same method in recording their observations. The duration of illness, for example, has been considered differently, and some investigators have omitted this item altogether in their statistical charts. Moreover, the concept of schizophrenia differs in various countries. The most we can do, therefore, is to take our bearings from the impressions which the individual investigators have gained during the course of their observations.

These impressions have been very favorable, indeed, no matter what country or scientific quarter the individual reports have come from. A few dissenting notes, to be sure, came from the psychiatric clinic at Wilno (Poland) and from Oslo in Norway, where Langfeldt did some work with a small number of cases. On the whole, however, there is a surprising unanimity as to the actual progress made with the help of the insulin treatment. This is particularly astounding, if we keep in mind that agreements on new methods of treatment have not been very common in our profession. Moreover, in checking the different remission rates, we find that the percentage of discharged patients, whose psychosis was of recent onset, varies between 50 and 80. Compared to this, there are some recent statistics showing that the remission rates for cases of similar duration of illness amount only to 30%, if the illness is left to its natural course (Bumke, Dussik, Ederle). These latter figures, of course, will have to be supplemented still further, but the fact remains that the success of the insulin therapy is at least twice as great as that of the general hospital care, without any special therapeutic procedures. Besides, the different investigators did not base their favorable reports merely on these statistical figures with their well-known sources of errors; they also took into account the individual reactions of the patients certainly related to the hypoglycemia, the entire course toward remission and subsequent follow-up of the patients in remission. These investigations not only enable us to see that there is a definite causal relationship between the insulin treatment and the different degrees of improvement; they also show that remissions obtained with the insulin therapy are qualitatively superior to the so-called spontaneous remissions.

As I have pointed out already, it is impossible to obtain a true picture of the progress of the insulin therapy from the total aggregates of the reported international figures. Yet, it is highly

desirable to examine some of the statistical data. For this reason, I should like to present the figures that have been collected from the different clinics and institutions in Switzerland. At the same time, I should like to take this opportunity to extend my special gratitude to the heads of these institutions and to those colleagues who have helped me to compile this material. The data in question have been entered on special questionnaires that were sent out on April 1, 1937. They concern a total of 495 cases and have been derived from 22 different institutions.[1] Moreover, in connection with this statistical inquiry we are fortunate in

TABLE I.

(Number of institutions which participated in our inquiry: 22. Total number of cases treated up to April 1, 1937: 495.)

Duration of illness = E.D.[3]	No. of cases	SR[1]+FR[2]		Cases influenced by the treatment		Cases not influenced by the treatment	
		Cases	%	Cases	%	Cases	%
Not longer than or up to 6 months	*210*	*124*	*59.1*	*174*	*82.9*	*36*	*17.1*
½–1 year	73	38	52.1	48	65.8	25	34.3
Not longer than or up to 1 year	*283*	*162*	*57.2*	*222*	*78.4*	*61*	*21.6*
1–1½ years	39	13	33.3	25	64.1	14	....
1½–2 years	49	11	22.4	29	59.2	20	....
1–2 years	*88*	*24*	*27.3*	*54*	*61.4*	*34*	*38.6*
More than 2 years	*124*	*14*	*11.3*	*54*	*43.5*	*70*	*56.5*
Total	495	200	40.4	330	66.7	165	33.3

[1] SR = social remission.

[2] FR = full remission.

having a number of advantages. The technique of the insulin treatment, for example, has been taken over directly or indirectly by these institutions from a single source only, namely, from the clinic at Münsingen; it has also been followed consistently, so that it was possible to establish a standard procedure for the evaluation of the individual results. Another advantage lies in the fact that, throughout Switzerland, the problem of diagnosis of schizophrenia is being handled quite similarly. And finally, in comparing the data recorded by a number of independent investigators with those

[1] Results from one institution were submitted too late to be included here; they relate to 65 cases, and thus bring our total number of cases up to 560—a number which at any rate can be utilized nonetheless in computing the mortality rate.

furnished by a large clinic, we find quite a levelling tendency in the different attitudes that are taken with regard to the therapeutic value of the insulin treatment.

In Table I, as in the following tables, the data on full remissions (FR) and on social remissions (SR) are combined into a single item. A separation of these two categories, although highly desirable, cannot be satisfactorily carried out, because they do not exclude each other. In fact, therefore, some clinicians prefer to use only the notation "social remission." The important thing to remember, however, is the fact that this combined group includes only patients who have resumed their occupations and to all intents and purposes appear to be in good health.

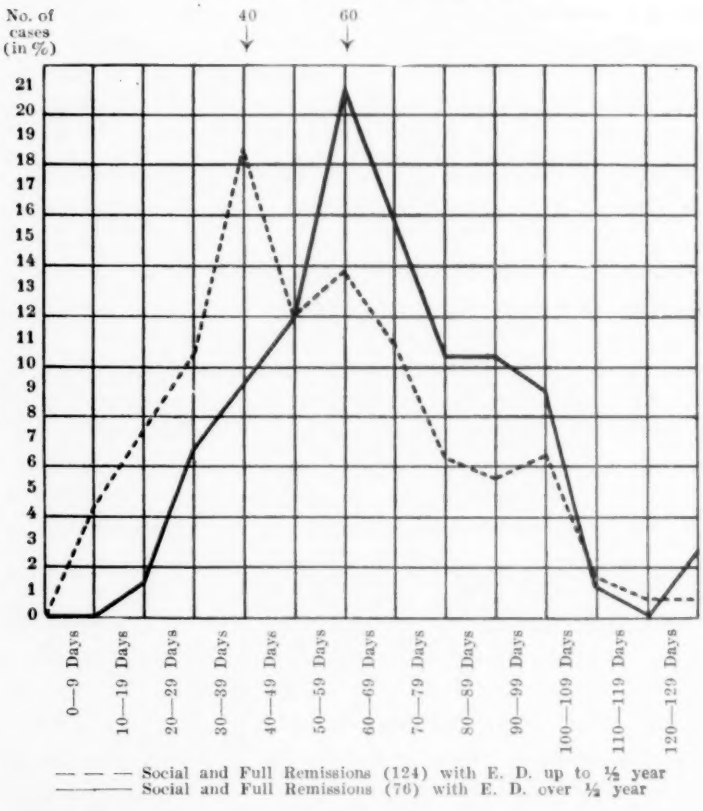
Naturally, the large mass of undifferentiated material given in Table I cannot be considered here in detail. To begin with, it should be noted that in those cases in which the duration of the illness [1] is less than six months, the percentage of remissions (SR+FR) is 59.1. Now, this figure does not come up to the high figures that have been and still are being reported by certain clinics. At the same time, our percentage still remains twice as high as that which one usually obtains in cases which are only under the general hospital care. The therapeutic value of Sakel's method, therefore, is by no means minimized by our results. Besides, if we include in our material the improved cases, we actually obtain a remission rate as high as 83%. More important still are the findings of the second group of cases in which the duration of illness is from six months to one year. Here, the percentage of remissions (52) is not far behind that of the first group (59.1). At the same time, we are justified in assuming that in the group of patients with the longer duration of illness, the time factor contributes to more adequate statistical estimations inasmuch as it accounts for the elimination of those cases which were only slightly affected by the psychosis or which were not clearly diagnosed. Thus, the figures of our second group are more convincing. Finally, it is evident from Table I that the susceptibility to the curative effect of the insulin treatment reaches its peak in cases of one year's duration of illness, instead of 1½ year's duration as I have previously assumed.

[1] Editor's note: In this paper duration of illness is designated by *E. D.* (Erkrankungsdauer).

One may infer then, that the figures of Table I represent the average results so far obtained in the widespread application of the insulin treatment. A closer examination of the different reports, however, shows that the results obtained by the individual institu-

TABLE II.

DURATION OF TREATMENT IN DAYS.



tions vary a great deal, and—as a matter of special interest—that the best results were reported not by clinics which showed great enthusiasm for the new method; on the contrary, clinics that had been most cautious and critical have scored the highest marks. This raises the question whether the individual unfavorable results, which, of course, adversely influenced the general outcome of our inquiry, were not caused by a faulty technique. Naturally, it is

hardly possible to make a complete check on this matter. In one respect, however, we have succeeded in establishing the existence of well-marked relationships, namely, with regard to the length of the treatment.

A compilation of the varied periods of treatment of the 200 cases listed under Social Remission and Full Remission shows a range from 2 to 161 insulin-days. The average is 52 days, and the mean, 54.5 days. A division of these cases into two groups, according to the duration of the illness—less or more than six months—shows that a prolonged psychosis also requires a longer insulin treatment. The average length of treatment for the recent cases is 50.5 days, that for the older ones is 61.7 days. These facts are more clearly demonstrated by the two curves, in which the cases are listed not in their absolute numbers, but in their percentage values, and that is in the two groups of cases with different ranges of the duration of the illness.

The curve indicating the length of the treatment for the old cases shows a slow rise, its peak is delayed and it remains higher markedly longer than in recent cases. For recent cases the culminating point is the fortieth day and for older ones the sixtieth day of treatment. In cases in which the treatment lasted between 60 and over 110 days, the remission figures are as follows:

TABLE III.

	Remission figures	
	Recent cases	Old cases
60 days	13.8%	21%
70 days	11.0%	16%
80 days	6.2%	10.4%
90 days	5.6%	10.4%
100 days	6.4%	9 %
More than 110 days	1.2%	1.2%
	44.2%	68.0%

This table shows that, when the duration of the treatment was 60 days and over, patients who were ill less than six months gave a remission rate (SR+FR) of 44.2%; those who were ill over six months had a remission rate of 68%. Since there is no reason to admit that the treatment in these cases was unnecessarily prolonged, we are justified in concluding that a treatment of insufficient dura-

tion does not allow a judgment as to whether or not favorable results might be obtained with a more prolonged treatment. Some cases may still benefit from the treatment of more than 90 days' duration. The treatment, therefore, should be continued at least three months before the case is given up as hopeless.[1]

At any rate, without further consideration, we may point out here that the dismissal of unaffected or only slightly improved cases already after two or three weeks of treatment, as it has been done by some institutions, has unjustifiably impaired or tainted our statistical figures. If we eliminate, therefore, all unaffected cases with insufficient length of treatment (less than sixty days) as

TABLE IV.

AFTER ELIMINATION OF CASES WITH INSUFFICIENT DURATION OF TREATMENT (LESS THAN 60 DAYS).

Duration of illness	After elimination of cases unaffected with the insufficient treatment			After elimination of unaffected and improved cases with the insufficient treatment		
	Total No.	SR+FR cases	%	Total No.	SR+FR cases	%
Up to 6 months	190	124	*65.3*	168	124	*73.8*
From ½–1 year	62	38	61.3	60	38	63.3
Up to 1 year	252	162	*64.3*	228	162	*71.1*
From 1–2 years	76	24	31.6	62	24	*38.7*
More than 2 years	99	14	*14.1*	91	14	*15.4*
Total	427	200	46.8	381	200	52.5

shown in Table IV, our remission rate for recent cases (duration of the illness up to six months) indeed rises from 59.1% to 65.3%; and by eliminating the cases that were only improved during a treatment of insufficient duration, we obtain a remission rate as high as 73.8%.

[1] Since the total duration of the treatment also depends upon various external factors, such as, for example, the possibility or inability of discharging the patient—which in its turn determines the duration of the phase IV of the treatment—we may raise the question whether it would not be more adequate to base our studies upon the number of insulin shocks. This procedure has been suggested in some quarters, but it would actually complicate our investigations. Besides, from more recent experience, we know that the hypoglycemic states which we designate as shocks, are not the only active therapeutic elements; some patients without showing strong hypoglycemic reactions may reach complete remission.

Table V is designed to answer the question as to the sensitivity of patients to the curative effects of the insulin treatment in the first attack of their illness and in the relapses. In the latter, to be sure, the results are somewhat less favorable; yet, the difference is so small that both in the first attack and, in the relapse, the general outlook of the treatment is the same. Moreover, cases admitted for more than three times—not shown in Table V—are as a rule, just as susceptible to the treatment as during their previous admissions.

TABLE V.

RESULTS OBTAINED IN CASES WITH PREVIOUS PSYCHOTIC ATTACKS.
(Only cases with duration of illness up to 1 year.)

No. of attacks	No. of cases (total)	FR+SR		Influenced		Uninfluenced	
		No. of cases	%	No. of cases	%	No. of cases	%
First attack	266	133	59.7	162	78.6	44	21.4
Subsequent attacks	77	40	51.9	59	76.6	18	23.4

TABLE VI.

RELAPSES.

Duration of illness	No. of relapses in					
	FR+SR		Improved cases		Total	
Up to 6 months (210)	8 (124)	6.4%	4 (50)	8.0%	12 (174)	6.8%
From ½ to 1 year (73)	3 (38)		1 (10)		4 (48)	8.3%
More than 1 year (212)	2 (38)		12 (68)		14 (106)	13.1%

Nothing definite, of course, can be said as yet with regard to the frequency of relapses. Apart from the cases recently discharged, our material concerns only those cases that have been in remission not very long, a year and a half at the most. Yet, I compiled all the cases which relapsed. Their proportion is not very high: as shown in Table VI it amounts only to 6.5% for patients in remission and whose illness was of less than six months' duration. It is interesting to note, moreover, that relapses occur more frequently in cases that are merely improved than in cases that are in remission, and that the danger of relapsing for individual patients increases with the duration of their psychosis.

Finally, the returns to our inquiry furnish enough material by now to attempt the consideration of a question which indeed should have been dealt with long ago, namely, the question as to how the different clinical types of schizophrenia respond to the insulin treatment. So far, in the literature on insulin therapy, the opinion has generally prevailed that the paranoid type reacts most favorably, whereas in the hebephrenic and catatonic and particularly in the stuporous and the negativistic types, the outlook is considerably less favorable.

TABLE VII.

	Total material		Duration of illness up to one year		Duration of illness more than one year	
Paranoids	*122*	%	64	%	58	%
FR+SR	49	40.0	41	*64*	8	13.8
Cases influenced by the treatment	83	68.0	54	84	27	46.5
Excited-catatonics	*140*	....	101	....	39	....
FR+SR	75	53.5	64	63.3	11	28.0
Cases influenced by the treatment	102	72.8	79	78.3	23	58.8
Stuporous-catatonics	*128*	....	63	....	65	....
FR+SR	46	35.8	35	55.5	11	16.9
Cases influenced by the treatment	83	64.8	51	80.0	32	49.2
Hebephrenics, doubtful cases	*99*	....	52	....	47	....
FR+SR	34	34.3	25	*48.0*	9	19.1
Cases influenced by the treatment	60	60.0	37	71	23	48.9

Now, in order to have at least a preliminary orientation on this question, I arranged all the available material under the following clinical types:

1. Paranoid.
2. Catatonic-excitement.
3. Catatonic-stupor.
4. Hebephrenic and of unclear diagnosis.

Among the diagnostically doubtful cases, there are many that cannot be put into any specific category; their diagnosis is very difficult, and many of them are probably close to both the psychogenic and the exogenic types of psychosis. I am well aware of the fact that the above classification may be questionable. Aside from the basic difficulty with regard to diagnosis, I am not quite certain that I correctly interpreted and arranged the data submitted to me by colleagues from different sources. Table VII, therefore, is probably tainted with many errors; but as a preliminary attempt to give a summary description of the available data, it may nevertheless be of some real value.

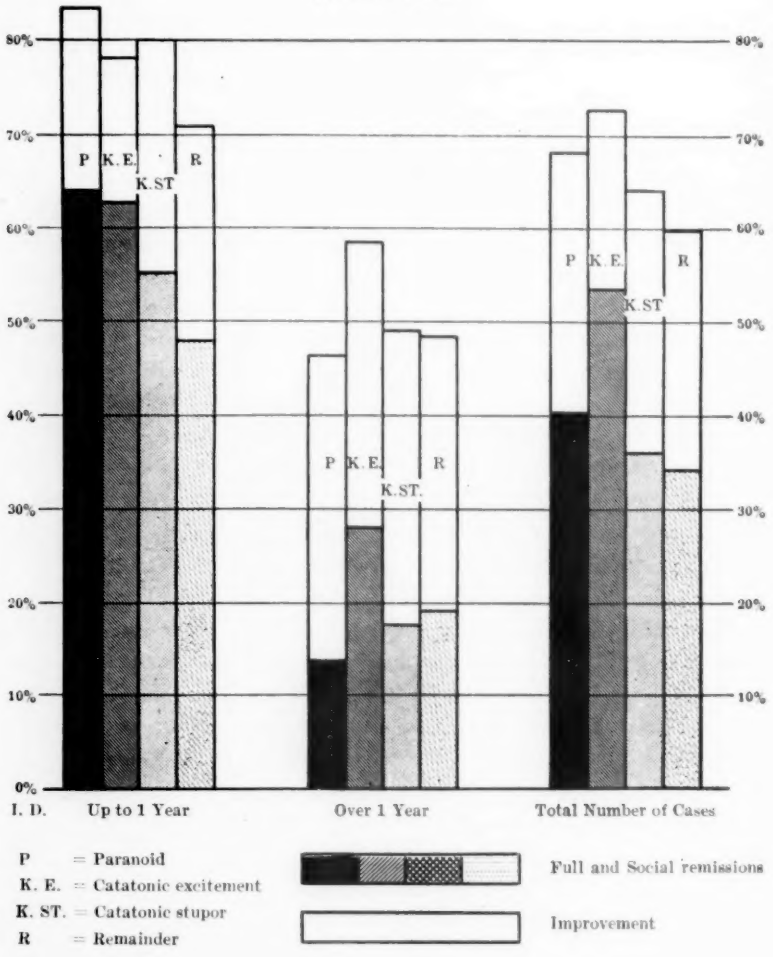
As it is clearly shown in Table VII, and more so in Chart II, paranoid patients whose illness is of the duration up to one year are at the peak; their rate of remission as well as that of improvement considerably surpasses the average remission and improvement rates. Here it is worth noting that in both, Table VII and Chart II, cases with an insufficient duration of treatment were not eliminated. The catatonic-excitement cases follow closely the paranoid ones, while the catatonic-stupor cases remain somewhat below the average remission rates and the cases with unclear diagnosis lag markedly behind all the other types of psychosis. With regard to this last-mentioned group, comprising cases of hebephrenia in which the therapeutic outlook is rather unfavorable, and cases of somewhat indefinite diagnosis, it should again be emphasized that this group also includes many marginal states, i. e., states characterized by periodic and rapid changes and by manic depressive coloring; some of these marginal states may react favorably to the general hospital care and manifestly unfavorably to the insulin treatment.

An entirely different picture, however, is presented by the cases in which the illness is of more than one year's duration. Here, the paranoid patients with regard to their remission rate make the poorest showing, whereas the patients in catatonic excitement in this respect surpass by far all other types. Furthermore, the diagnostically doubtful cases are above the patients in catatonic stupor. While making due allowance for the aforementioned reservations, we can state, however, that *paranoid patients offer an especially favorable prognosis with regard to the insulin treatment as long as the duration of the psychosis does not exceed one year;* after that, the prospects of recovery diminish more rapidly than in the other types, especially in those with catatonic excitement. Yet, even with the duration of the illness over one year, paranoid patients still have better chances of improvement than other psychotic patients; so that, with the exception of the cases of catatonic excitement, the number of cases which were influenced by the treatment is nearly the same in each of the remaining groups.

In making a preliminary survey of our material, we find that the number of cases which benefited from the insulin treatment is equal to the average remission rates that have been reported so far. Thus, the results are quite satisfactory, although in some instances higher remission rates could probably be obtained if the

treatment were carried out more carefully. Special attention should be paid to the adequate length of the treatment. Furthermore, one should bear in mind that patients in paranoid and catatonic excite-

TABLE VIII.



ment states still are the most favorable types for the insulin therapy, except that the paranoid schizophrenics will react favorably only during the first year of illness.

Some of the objections made against the insulin treatment concern its dangers. The facts are, however, that the danger is very small if the treatment is carried out competently and carefully. From a compilation of the pertinent bibliographical data, I found out recently that out of 700 cases treated, there were 7 fatalities. This gives us a mortality rate of 1%, which is considerably less than the mortality rate in the rank and file of daily surgical interventions. As regards the Swiss material, the mortality rate is still smaller; only two cases of death are reported in the 495 (really 560) patients who had the insulin treatment. As a matter of fact, in one of these two cases it is doubtful that the death was caused by the treatment. Our mortality rate, therefore, is even below 0.5%

Permanent injuries are incurred occasionally, but they are really an exception. As a sequel to prolonged shocks, the Korsakoff-like dementia has been reported, which receded, however, after some time. A more persistent hemiplegia in a few cases was also recorded. With regard to these sequels and at least to some of the fatal cases, the question arises if, and to what an extent, these accidents could be avoided by a more careful application of the insulin treatment.

From these facts, we can easily see how it is important to use an adequate technique in the insulin treatment. In this respect two distinct tendencies have been so far prevailing.

The first, advocated by Frostig of Warsaw, seeks to establish a uniform and standard procedure. This author holds that the experimental stage of the insulin treatment is practically over by now; it would, therefore, be appropriate to establish general principles and directions. A more systematic procedure, he asserts, would make for a better understanding of the details, an easier way of learning the technique, and better chances for the prevention of failures.

Against that point of view there is the tendency towards a greater individualization of the treatment, taking into consideration the characteristics of each individual patient and trying to modify and improve the treatment accordingly. This tendency finds justification in the fact that many patients in whom the therapy is indicated, prove, however, to be refractory to it. But above all, this attitude appears to be the correct one when one bears in mind the well-known fact that different patients do not react in the same manner

in different phases of the hypoglycemia. These phases are: mild hypoglycemia obtained with small doses of insulin, the pre-comatose state, the onset of coma, the deep coma, and finally the epileptic seizures. Each of them, under certain circumstances, may be the outstanding factor in the general outcome of the insulin treatment. Sakel himself, in the course of time, has changed his original procedure in using the therapeutic qualities of one or the other of the aforementioned phases specifically in different schizophrenic types (catatonic stupor—catatonic excitement.[1]) On the other hand, Claude and Rubenovitch emphasize the value of a simultaneous psychotherapeutic treatment. And finally, an improvement was recently obtained by combining the insulin and cardiazol treatments (Georgi).

It is certainly justifiable to restrict reckless experimentation with the new method. Often an excessively cautious or careless procedure, inadequate treatment, or arbitrary and unwarranted departures from the standard technique lead to failure and tend to discredit the whole therapy. Nevertheless, I am convinced that the trend given to psychiatry by the insulin therapy should not be hampered needlessly. We have every reason to be gratified with new findings, or even proposals, that offer at the same time improved results and new insight into treatment. It is still too early to impose on our procedure the fetters of a fixed routine. Of course, no departure or modification should be attempted without careful and thorough study of, and long experience with, the classical technique.

For this classical technique, especially for the handling of hypoglycemia, certain rules have been set up by Frostig. I should like to present some of these in brief form.

1. The treatment is to be carried out at central insulin stations. Here continuous medical supervision during the whole period of hypoglycemia and the assistance of a specially trained staff of attendants are definite requisites.

2. Insulin shock is not the only therapeutic factor, but it is a most important one and needs accurate definition and interpretation. We take as the onset of shock, according to Frostig, the appearance of motor disturbances (clonic contractions) or inter-

[1] Wien. Klin. Wschr. 1936.

ruption of contact with the outer world (no response to call, touch). The dose should be such that the onset of shock occurs the second or third hour and its terminal symptoms not before the fifth after the insulin injection.

3. In regulating the dosage, the acquisition of hypersensitivity to insulin during treatment must also be taken into account. Two-thirds of the cases exhibit hypersensitivity which may go so far that less than one half the original dose becomes sufficient to produce the same clinical reaction as the latter.

4. Protracted shock constitutes a special problem, especially when it exists with normal or even high blood sugar. In these cases, hyperinsulinism is to be feared from excessive administration of sugar. Better measures are small quantities of sugar in repeated doses (Bickel), the use of betaxin (Freudenberg), lumbar punctures, and saline infusions.

5. With regard to epileptic seizures, a distinction must be drawn between those of early hypoglycemia—one to two hours after the injection—and the late ones which occur in deep coma and even after the administration of sugar. Experience shows that the early seizures are the less dangerous ones and they require no immediate intervention, but at the conclusion of the attack the hypoglycemia should be terminated. The late seizures demand immediate injection of adrenalin and intravenous glucose.

Before concluding my brief review, I should like to say a few words about the manifold scientific problems raised by the insulin treatment of schizophrenia aside from its therapeutic aspects. These problems lie in the most diverse fields and interest alike physiologists, internists, neurologists, psychiatrists, and psychologists. This is the most outstanding and fascinating part of the new method of treatment.

For instance, the physiologists will want to know the effect of our massive doses of insulin on the organism and its endocrine balance, and the relation of each of the clinical symptoms, regarded as caused by hypoglycemia, to the induced various pathological changes. What is the primary toxic effect of insulin? What are the characteristic manifestations of reduction of sugar in the blood, cerebrospinal fluid, or tissues? What are the consequences of compensation by adrenalin secretion? What changes accompany

the other manifold endocrine disturbances? I hope many of today's reports will make new and important contributions toward answering these questions. We should not forget what a gigantic experiment in human physiology insulin therapy affords. The opportunities it offers, I think, are well-nigh inexhaustible.

The neurologist will be interested in our observations in the field of motor and tonic reactions, disturbances in reflexes, cortical and subcortical symptoms during hypoglycemia. Together, they constitute a chaos that still admits of no clear concept. Constructive work is impeded by the ease with which organic brain pathology is passed over into psychopathology. I mention in this connection the comprehensive work of Angyal, who thinks he has established in the course of hypoglycemia a lesion advancing from the frontal pole through the motor area to the subcortical and bulbar centers. This concept explains satisfactorily the torsion spasms, tonicity, primitive movements about the mouth, but still lacks a strictly scientific proof. It is not yet clear whether most of the symptoms are cortical or subcortical. Some have even been relegated by French authors to the periphery by analogy with the action of curare. Of special importance is the major epileptic seizure, the aetiology of which we understand but poorly even today. We know only that its appearance has nothing to do with hereditary predisposition.

The psychologists will be interested in the alterations in perception observed in the mild stages of hypoglycemia, especially after waking from coma. One observes then disorientation in time and space, kinesthetic disturbances and impairment of vision (in three dimensions), etc.

The richest field for work awaits the psychopathologist. The following problems are to be distinguished:

1. The reactions during hypoglycemia which create the impression of being independent exogenous toxic psychoses. They may be observed, though not very frequently, in the over-dosage of insulin in diabetics and in cases of spontaneous hypoglycemia. Their extraordinary diversity, with symptoms changing in the course of treatment even of the same case, raises the question as to how far they are conditioned by the prepsychotic specific personality traits of the patient. It may be possible to differentiate personality types by their psychotic reaction to hypoglycemia.

Although I have always maintained the opposite view, it may be that many of these phenomena, as Sakel believes, have to do with the schizophrenic psychosis and the beginning of its cure.

2. No less important, but still insufficiently studied, are the phenomena of remission and all those departures from the original schizophrenic picture which we observe during the hypoglycemia, in the phase that follows coma, and in the progressive improvement of the patient's condition. There are, of course, definite stages in the mental clearing as the schizophrenic symptoms pass away one by one. First, as I have tried to show, comes the resolution of the typical schizophrenic "atmosphere," next a fading of the secondary symptoms, hallucinations, delusions, stereotyped behavior, and the complicated process characteristic of spontaneous remissions is largely avoided. Nevertheless all these statements are based more on subjective impressions than on reliable and adequate research.

3. Finally, the mental status of schizophrenics who are said to be completely cured after a course of insulin requires careful study. Is the assertion true that there are absolutely no defects to be found, not even the slightest lowering of the personality level, or lack in spontaneity, in activity? What about the statement so often heard that after the insulin cure, the patient feels better than before the psychotic attack, and his relatives confirm the impression? That his illness and its treatment have left him a sense of spiritual triumph? How are we to judge those cases that exhibited neurotic reactions years before the outbreak of schizophrenic reactions and after insulin treatment were at once relieved of both?

These few remarks may suffice to indicate the multiplicity of problems still awaiting solution. Above all, stands the great mystery, the *modus operandi* of our therapeutic measure. We have made no advance in this direction and must be content for a long time to come modestly to raise the question without answering it. Too many unknown factors play a part to allow us to venture any positive statement even by way of hypothesis.

We must also ask ourselves whether the effect of insulin therapy on schizophrenia is to be regarded as specific or non-specific. One might be inclined to give considerable weight to the former concept.

There is the fact that up to the present, as far as I know, attempts to treat other psychoses, especially the manic-depressive type, have failed. Indeed, it seems that cyclic schizophrenias with manic-depressive features are conspicuous for their poor response to insulin. This is even more striking when we recall that manic and depressive symptoms not infrequently appear as individual reactions to hypoglycemia as well as after the ensuing remission. In favor of the specificity of insulin is also the fact that those schizophrenic patients who are most true to the type, according to the old definition, are the very ones who are earliest and most decisively affected by insulin.

On the other hand, we must not forget how elusive are the clinical features of the genuine schizophrenia. Although such an eminent authority as Bleuler has paid special attention to this problem, we are still inadequately enlightened as to which elements in the picture of schizophrenia should be referred to the fundamental schizophrenic process and which should be regarded as pathoplastic phenomena or "superstructure." In their concept of what is essential in the true schizophrenia, different schools and different countries are widely divergent. I need only remind you of the work of Kleist and the departure of the French and Dutch schools from our Swiss idea of schizophrenia.

It certainly seems evident that our picture of schizophrenia represents no biological entity. And yet we see that insulin can exert a beneficial action on the most diverse clinical forms while at the same time in all forms, no matter how classified, failures appear. Even though there are differences, as may be inferred from my illustrations and from the experience of other authors, these differences are not of a fundamental nature. It is therefore not easy to believe in a specific effect of the insulin therapy, so long as such clinical multiformity, so long as this motley array of psychotic pictures, continues to be influenced in much the same way.

Moreover, it is not only this multiformity in the material we start with that makes it difficult to formulate theories about the essential therapeutic action of insulin; it is also the multiplicity of those factors in the method itself which may exert therapeutic effects. I need not repeat that according to our experience any phase whatever of hypoglycemia may have a beneficial influence.

These findings should stand as a warning not to approach the problem from one side only. Neither the endocrine phase of the treatment, nor brain pathology, nor the question of convulsions, nor the soothing, quieting effect, nor failing consciousness, nor the potent psychic shock in which the patient is led up to the door of death, is alone sufficient to solve our problems. Nothing less than a careful consideration of all the factors, clinical, endocrine, and psychopathological, may some day bring us a step nearer to our goal. Possibly such a comprehensive investigation will yield us not only insight into the dynamics of our therapy, but also some basic conclusions about the essence and pathogenesis of schizophrenia.

No doubt you will be surprised, ladies and gentlemen, that I close my paper with bald questions and insist on how little we know and how uncertain is the ground whereon we stand. Nevertheless it is unquestionably more appropriate modestly to point out that we are still only at the beginning and to indicate where to seek the unsolved problems than to construct hypotheses for which we lack the necessary foundations and which could have only an extremely fragmentary character.

I do not want to close without emphasizing particularly this one thing: Sakel's insulin therapy for schizophrenia has stood its first practical test. Even though the peak of cures attained in the Vienna clinic has not been matched everywhere, we still have every reason to be gratified with the results so far achieved. And I believe that today the discussion of the method has passed that early stage which all new and courageous enterprises must pass, when there enters all too often a spirit of antagonism and propaganda which threatens to destroy cool and objective reasoning in both camps. I venture to hope that this meeting of ours will move in an atmosphere of kindly disposed and dispassionate scientific work. Certainly each of us who has been intensively occupied with the method of Sakel cannot help being struck over and over again by the abundance of opportunities, problems, and wide vistas spread out before him, which give an incentive to our profession for which we can only be grateful.

4. THE NATURE AND ORIGIN OF THE HYPOGLYCEMIC TREATMENT OF PSYCHOSES

MANFRED SAKEL[1]

Dr. Müller's remarkably exhaustive paper, as well as the contributions of colleagues with whom I have been in direct contact all the while, relieves me of the obligation to report again on the details and the clinical problems. Therefore, I should like merely to make a few remarks concerning the history of this therapy and its development.

That insulin therapy has attained the distinction of being one of the main themes of this conference is due to a man whose name is not on our program. He is the head of the Vienna clinic, Prof. Otto Pötzl. Professor Pötzl recognized intuitively from a few clinical observations the significance and the possibilities of this therapy. He had the courage to uphold it with complete devotion in spite of its hazardous aspect. He placed at its service his clinic and his own great scientific resources. He commended it warmly to others for control studies. He contributed substantially to its development. Although the treatment by hypoglycemia is older in point of time, its practical application begins at the moment when Professor Pötzl introduced it into his clinic.

The therapy dates back to 1928. It is an outgrowth of observations made by me in the course of the attempted treatment of morphine addicts. I thought, first of all, that insulin abolished the phenomena of irritation during abstinence from morphine because the nerve cells were blocked and their function quantitatively affected. Starting from this observation and this idea I attempted to influence other states of excitation by means of insulin. At this point, as often happens in such matters, I was helped by chance. By chance I produced deeper hypoglycemic reactions than I had intended. I was able then to observe that such reactions led to much quicker and more substantial alterations in mental states, and could even cause psychotic symptoms to vanish. I endeavored to evaluate these observations systematically and drew the practical conclusion that hypoglycemia was evidently responsible for these changes.

[1] Lecturer, New York.

I next distinguished two types of shock, the moist, which was more frequent, and the dry, in which an epileptic attack was likely to occur. Above all, I laid stress on the epileptoid phenomena. In the early period, before I had adequate insight into the clinical action of hypoglycemia, I was inclined to seek its therapeutic effect in cell shock. Consequently I first ascribed the greatest importance to the epileptoid components of shock therapy. In order to make them still more prominent, I introduced during hypoglycemia a series of drugs calculated to bring on epileptic seizures. Among these I tried first strychnine, and then, assuming that the convulsions are due to a disturbance in water balance, I tried drugs that induce perspiration or diminish it. Also I tried the administration of camphor and cardiazol both before and during insulin shock as a means of provoking seizures. Although much time has passed, all these problems are still unsolved. In the course of years I have, in most cases, abandoned supplementary medication aimed to provoke epileptic attacks. With time I have gained the impression that hypoglycemia as such, and nothing else, acts on the psychoses, while the epileptic attack prepares the way by unlocking the gates and altering the psychotic picture. The manifestations observed during hypoglycemia solidly support this impression. Of course, I will not say that shocks and epileptic attacks have no beneficial influence. How could I, when we know that there are cases that react to every kind of shock? My experience indicates that the epileptic shock breaks down barriers and prepares the field for the hypoglycemic effect. I shall take the liberty of using an illustration I have used in the Vienna seminar. The epileptic attack is the artillery, the hypoglycemia is the infantry in the battle against the disease. According to military theory, the artillery never conquers and occupies hostile territory. It can only open the way for the infantry. We see that in most cases of acute psychosis, the epileptic attack does good. This improvement is only transient and incomplete unless the territory so opened up is occupied by the hypoglycemia. These are still unsolved problems. There are things that can be explained only when the physiology of the action of insulin on psychoses is better understood. Until then we must be content with a working hypothesis to help us decide when an epileptic attack is desirable and when it is not.

The skeptical attitude of the medical sciences towards this special kind of therapeutic measure is due to the wide gulf between its basic concept and the habits of biological thought behind every other therapy. Modern medical thought has taught us that every effective therapeutic measure must be founded on biology. It must take its place in the nexus of natural events according to physiological principles. In this framework fever therapy easily found a place. Fever therapy was not so foreign to medical thought. At the time when Wagner-Jauregg's accomplishment drew attention to its therapeutic value the discovery had been made that fever is one of the defense mechanisms of the body. Moreover, the etiological agent and the pathological anatomy of general paresis were already known. Wagner-Jauregg's advance was a natural outgrowth of conceptions already firmly established.

The treatment of psychoses with hypoglycemia is a very different thing. The nature and etiology of the schizophrenic process are altogether obscure to us. More than that, there is even disagreement as to whether we have to do with a disease entity or merely with symptomatic pictures. Not only do we know nothing about the schizophrenic process, we do not even know anything about the states that precede and accompany normal thinking, to say nothing of hallucinations or delusions.

I too respect strictly scientific methods of thought. I should be glad if it were possible to follow in this special field the method of procedure customary in medicine, i. e., first to investigate the cause of the malady, and afterwards to look about for a corresponding mode of treatment. But once a path is accidentally found which begins at the point that should be the end of the journey, shall we have the temerity to abandon it, especially in working with a disease as difficult as schizophrenia? And if the hypoglycemia therapy fulfills even part of its promise, it will be possible, I think, to reverse the usual course of inferences and in going backwards to learn about the nature and prime cause of schizophrenia.

I am aware that the journey is a long one, probably very long and laborious. Nevertheless I believe I may say that it is worth being pursued even though the ideas that started me on it were shown to be false and irrelevant. You must not confuse the

hypotheses and their errors with the treatment. Its practical application is in this instance superior to the theory behind it.

My working hypothesis is only a bare outline; it starts with the biology of the nerve cell and is based on the assumption that the nerve cell is analogous in function to a combustion engine and its performance, therefore, is to be judged by analogy with the performance of the engine. The normal working capacity or power of the nerve cell like that of the engine must be maintained by the availability of a corresponding quantity of fuel. The degree of potential energy of the nerve cell depends on a combination of exciting and inhibiting elements. The balance is constant for the individual and is automatically maintained at a definite level. When the automatic regulating mechanism is disturbed by some disease process, an excess of the exciting element, like an excessive supply of gasoline, may lead to a pathologically high rate of metabolism. Likewise when the gasoline is shut off or the inhibiting principle comes to the front, a weaker reaction follows. The constancy of the tone normally set up in the cell is dependent, like that in the engine, on the proper balance of exciting and inhibiting elements. I attempted to apply this scheme to the withdrawal symptoms seen in morphine addicts.

With the use of borderline doses of insulin, we could observe the accidental appearance of certain psychic and even character changes. The assumption of a simple quantitative diminution in cell function was no longer adequate. As clinical observations accumulated, I could no longer ascribe the results to chance but was impelled to assume the existence of a causal connection with hypoglycemia. Observations like the following could not be overlooked. Patients with extreme egoism and an egocentric disposition bordering on autism became extraverts, extremely accessible and dependent on others after an accidental hypoglycemic shock. This change often became evident in the first days after withdrawal of morphine, i. e., when we usually see an exaggeration of asocial traits in patients with pronounced psychopathic tendencies.

I was led by the following observations to treat psychoses by hypoglycemia. The intense fixation seen in psychotic anomalies is toned down, the rigid pent-up personality is relaxed, the affect is reversed and this reversal is maintained.

I shall not discuss the method developed to attain my objective, but I shall sketch briefly the working hypothesis which guided me in applying different procedures to different psychotic pictures.

The assumption of a diminution in the function of nerve cells through insulin sufficed to explain its soothing influence on states of excitement but failed to elucidate the psychic changes during and after hypoglycemia. The schematic concept that helped me to elucidate these processes was essentially this:

I look upon a reaction of the nervous system as a response to stimuli, traversing certain pathways. Then the processes in hypoglycemia may be explained by a blocking of pathways previously active so that reactions to the same stimuli run their course over pathways previously inactive.

To make my idea clearer, I shall start with an individual of one cell. Here too every reaction is to be regarded as the response to a stimulus. The energy of the cell is consequently set free by a signal or stimulus. The type of reaction depends on the type of stimulus and these two are equivalent. For this series of events to occur, the course of the impulse from the receptor to the effector must lie in an appropriate pathway within the cell. The more primitive the cell, the smaller the number of variants in the reaction and the fewer the corresponding pathways. As the organism develops and the diversity of the reactions increases, it becomes necessary to lay down new pathways. In this process the more primitive ones are overshadowed and pushed into the background by the newer ones. In an individual of many cells the impulse must be transmitted to another cell by a definite pathway connected with the receptor cell in order to call forth a final pattern of activity. For any stage of evolution these intracellular pathways are specialized and fixed so that they guarantee in their response to adequate stimuli a precise execution of reactions even as complicated as thinking processes. A stimulus inadequate for a certain pathway would start no impulse over it and rouse no response to that particular stimulus. In the course of great evolutionary phases the reactions become ever more complicated. The impulses too are altered. Hence the necessity arises for opening new pathways. The old ones sink further and further into oblivion but the proper relation remains between a stimulus and its original pathway. The

pathways developed last are, in the history of the race, the newest as well as the more complicated and more frequently used.

Now experience teaches us that the newest and most active organs as well as the most recently acquired pathways are most susceptible to injuries. When a nerve cell is injured the pathological change may be qualitative or quantitative. In qualitative injuries the newest pathways in the individual cell and the most recently developed organs in the whole organism suffer. The amount of damage to the newest pathways is proportional to the extent of the injury. Consequently, the reactions in the damaged cells must follow older pathways already in disuse. After stormy assaults on the integrity of the organism there may be even destruction and confusion of intracellular pathways. Obviously in the former case the result will be a primitive type of relationship to the outer world, in the latter a disorganized and disoriented relationship. With the setting up of short circuits there may be release of inappropriate reactions. For instance, a stimulus can provoke a reaction over its proper pathway and at the same time by following a short circuit it can start reactions over another or several inappropriate pathways, which may run in an ascending or descending direction. Now a response set off by such a short circuit without its appropriate stimulus is perceived falsely as the appropriate stimulus. For instance, stimulation of the sense of smell may be short circuited so as to release responses over visual or auditory pathways. This is the schematic representation of hallucinations in psychotic individuals as derived from observations of the effect of hypoglycemia on hallucinations.

A clinical illustration: The patient had continual auditory hallucinations for decades and in the course of years had constructed a whole system of delusions. After four weeks of treatment the dose sufficient to produce shock reactions was reached. During the period of hypoglycemia, before the onset of coma, the hallucinations disappeared for about an hour. With the continuance of treatment, hallucinations were absent for about one hour before the onset of coma and for three hours after the termination of the hypoglycemia as well. During these free intervals the patient showed no sign whatever of physical discomfort. No change of environment and no physical disorder were responsible for the disappearance of the hallucinations, as is evident from the following circumstances.

In the first days of their disappearance the patient offered the explanation that his enemy had been restrained from persecuting him. Later when he saw that the hallucination regularly vanished during and after hypoglycemia, with no suggestive questioning, he came to the following conclusion: "The trouble must be within me because the voices were gone while I was being treated and their absence was therefore evidently not due to thwarting or abusing my adversary." I do not wish to call this insight. The paranoid disposition of the patient lasted too many years for that. It was interesting to observe the struggle between his paranoid system of delusion and his true logical inferences.

The following case shows that no suggestive influences play a role in the disappearance of hallucinations during and after hypoglycemia. The patient, a woman, had had a paranoid schizophrenia for about a year with purely auditory hallucinations. After four weeks of treatment with hypoglycemia the auditory hallucinations completely disappeared, although the patient was not yet cured, for she had no insight and spoke of her hallucinations as of real events, however only in relation to the past. For example: "I am well again. I can go back to my work. You know, they told me over the radio that my job has been kept open for me. You hear it too." When the attendant adopted a listening attitude and said, "No I don't hear anything. What do you hear?", the patient listened closely and said, "No, I don't hear anything now. I haven't heard it for several days, but it is true."

Now a brief example of visual hallucinations: A young girl who had been in the hospital for several months saw signs, letters, and figures on her upper arm, which her intended husband had tattooed on her from a distance. After the first shock reaction, about sixteen days from the beginning of insulin therapy, the visual hallucinations passed away. To the question, which she was asked daily: "What do the marks on your arm mean?" she answered, after a moment's thought, "I believe my sight is getting poor, I do not see them now. I must have my eyes attended to so that I can see them again." After the hypoglycemia was terminated, the hallucinations reappeared, but during each successive period of hypoglycemia they were absent for a longer time, until they disappeared altogether. Nevertheless, it was long before she admitted the unreality of the visions, even in relation to the past.

Hypoglycemia, then, has apparently broken the pathological pathways and cut off the short circuits. In this way the passing of impulses across to an inappropriate pathway is prevented; with further use of hypoglycemia the short circuits are more and more fenced off and isolated. Eventually every stimulus starts an impulse over the proper pathway only. This idea of the mechanism of hallucinations is, of course, only a schematic picture.

It is far more difficult to apply this scheme to a field so abstract and intangible as that of mental and spiritual processes. At the risk of dwelling upon mythology, I must divide the psychic processes, so to speak, into cellular components because there is no other concept that will illustrate the mode of action of hypoglycemia upon them. Only by way of excuse for this assumption, not by way of confirming it, I begin with analogous neurological observations which are more concrete and always capable of being recorded. I mean the abolition of the reflexes, according to their rank in the evolutionary scale, as hypoglycemia deepens into coma, and again with the rise in blood sugar the reappearance of these reflexes in the reverse order. It must not be overlooked that those organs and functions which are phylogenetically and ontogenetically the latest are eliminated soonest and most completely, and after them in regular sequence those that are older. Thus the cremaster reflex is first to disappear, the Babinski sign ushers in the coma, while the corneal reflex is retained longest because it is the oldest and most resistant to hypoglycemia. And even after all these are eliminated stratum by stratum, the respiratory center is the last to be attacked. The temperature regulating center suffers much earlier since it is, if I may say so, a later acquisition. With the termination of hypoglycemia and the restoration of normal relations the first to recover are the older, more resistant centers, e. g., the ones controlling respiration and temperature, and among the reflexes first the more primitive corneal reflex, much later the Babinski, etc. The sensitivity of all those elements that are, from an evolutionary point of view, more recent and more complex is evident also from the more rapid and more complete elimination of the phylogenetically dominant left hemisphere.

Passing over to the psychic sphere, we may explain the varying reactions to identical phases of hypoglycemia on the assumption that here too those components of the psychic content that are

most dominant and active are the ones most quickly and effectively abolished. This assumption fits also the fact that in hypoglycemia the depressed patient is frequently converted into his opposite, the manic; the manic becomes depressed, the confused clear, the excited quiet, the stuporous alert.

I had to assume that in psychoses, hypoglycemia abolishes and subdues principally and probably first of all the parts of the psychic life which have been most active and, so to speak, most vital. Thus it permits the other antagonistic part to reach the surface and to attain a dominance, which at first is only transient. In cases which run a favorable course, hypoglycemia, frequently and correctly induced, leads to a permanent restoration of previously suppressed psychic components. At the same time those that were previously active are weakened and submerged. This pattern fits also the astonishing observations made on the so-called activated psychoses and on the phenomena of reaction-reversal, about which I shall speak later. All these complicated attempts at explanation, false though they may be, were necessary as working hypotheses to aid in developing a very complicated method of inducing and using hypoglycemia, a method which has been modified with respect to the degree and the time of termination of the hypoglycemia and now yields favorable results in various clinical types. This working hypothesis is only a schematic exposition based on years of apparently contradictory clinical observations. I shall discuss the technique itself only very briefly, for I am convinced that I could give my audience at best only a vague conception of it, however good my description might be. No explanation, however complete, can point the way to fruitful results without practical study and experience. Before hypoglycemia can be recommended as a therapeutic principle, some procedure must be developed to permit its routine use without too great danger. Here I must insist that proper technique in the hypoglycemic treatment of psychoses is as important as hemostasis and asepsis in a surgical operation and is a necessary routine precaution against danger. The success of the operation depends on adequate knowledge and experience on the part of the surgeon. In order to use hypoglycemia successfully, the physician must be capable of acting as quickly as the situation demands. The technique alone promises nothing. The decisive factor in determining the result is the method of handling the

details of the individual case. Adherence to the outlines of the standard procedure is of the utmost importance because this procedure rests exclusively on empirical rules. Our ignorance of the actual point of attack of this therapy forbids us to set up arbitrary regulations. Excessive optimism with regard to this method is more dangerous than expectant pessimism, because it may lead to amateurish employment of the technique, resulting in failures which will then be blamed on the therapy itself. The hazards of the insulin treatment must, of course, be avoided, but they must not occupy the mind of the physician so completely that he forgets the treatment itself. For in many cases favorable results are attainable only within the danger zone.

The foregoing remarks claim to be nothing more than a chronological account of the genesis of the hypoglycemic treatment. The same thing is true of the theoretical considerations which served as a working hypothesis for the development of the therapy. Finally, I shall only briefly mention that I do not, of course, consider the mechanism so simple as I have pictured it. I have the impression that among the many components which constitute the effect of the therapy, the vegetative system and the water balance play a rôle. For instance, with catatonic patients, more frequently than with others, we see a very slight amount of perspiration or even a dry skin during hypoglycemia although there is no epileptic attack. It seems to me that these very phenomena delay improvement. Recently I tried to alter this reaction-type and with some success, I think. For this purpose I administered quinine immediately before terminating hypoglycemia, and I thought that this influenced not only the water balance but also the vegetative system. In several cases under observation a positive effect could be produced. However, there are still too few of these cases to call the results ultimately valid. Now theoretical considerations, which have not yet been, and perhaps never will be, proved, are not sufficient to plead the case for the usefulness and practicability of a new therapy. I am conscious of the fact that earnest psychiatrists can be convinced of the efficacy of a treatment only by overwhelming clinical evidence. Since there is too little space here to bring forward lengthy documents concerning clinical observations and results, I shall attempt merely to present some characteristic facts

which speak for the practicability and perhaps also for the logical correctness of the therapy.

Frequently even the very small doses of insulin used at the beginning of the treatment cause remarkable changes. The patients become calmer and relax. But these alterations do not really differ much from the quieting effects brought about through other therapeutic means. But upon reaching a higher degree of hypoglycemia in the form of coma or an epileptic shock, these changes become amazing. From one minute to the next, so to speak, the psychic picture is strikingly transformed. One cannot escape the impression that the hypoglycemia is consistently forcing the psychic changes in a definite direction. It really appears as if another personality had suddenly replaced the psychotic patient's own. Completely confused patients suddenly become lucid—though at first only for a short time—those utterly possessed by hallucinations are freed of them; the violent become calm in the hypoglycemic state, and the stuporous are alert. A paranoid patient, for example, suddenly loses his delusions and ideas of reference when the hypoglycemia has reached a certain depth. He even gets insight into the morbidity of his past hallucinations. At the beginning of the course of treatments the patient regularly becomes psychotic again when the hypoglycemia is over. This reversal happens as suddenly as if one consciousness were cut off by another. With continued treatment, the lucid phases last longer and longer, the normal personality, so to speak, keeps its hold longer and even continues for a time after the termination of the hypoglycemia. The phases of the predominance of the normal personality become increasingly longer and their quality better, so that finally they extend to the next treatment. One cannot avoid the impression that every period of hypoglycemia destroys something of the psychosis and ever more and more makes possible the strengthening of the previously normal personality. When a certain point has been reached, something unexpected happens. The patient, who at the beginning of the therapy could regain his normal personality only for a certain length of time during hypoglycemia, with continued treatment and improvement becomes psychotic again for short periods during hypoglycemia. This I call the reversal reaction. One sees clearly the battle between two states of consciousness which are struggling

for dominion, and the one that was dominant in the past is crippled in the hypoglycemia in favor of the one suppressed. The activated psychotic phenomena of the reversal reaction show in concentrated form, almost as in a mirror, the form and course of the psychosis before and during the treatment. In patients from whom the schizophrenic mask does not fall suddenly in hypoglycemia, permitting recovery, for however short a time, of the normal personality, there is at least a suppression of the psychosis. Through the hypoglycemia one can, so to speak, push the psychosis back step by step to its earlier position: in favorable cases back to the prepsychotic personality. Rather it is true—as the reversal reaction and the activated psychoses show—(one cannot yet conclude on this basis that hypoglycemia has an antipsychotic effect) that hypoglycemia cripples the formerly acute and dominant part of the psychosis in favor of the suppressed part of the psyche. With continued treatment, it is true, psychotic remainders which are activated only in hypoglycemia, seem to become progressively less and finally to disappear. A clinical example:

Dr. N. N., Age 40, physician. Patient's mother was psychopathic. She committed suicide. For some years the patient's wife, who was trained in medicine, had noticed a progressive alteration in him. Formerly friendly, gay, frank, he became increasingly ill-tempered, unnatural, strange. Some months before commitment he was queer. He expressed confused ideas, complained intermittently of vague hypochondriacal fears. He felt himself physically and mentally changed. Without any reason, he had an operation on the caecum. He became increasingly withdrawn, confused, silent. He began to play cards, contrary to his former custom, so that he "would not have to think." "He had long feared losing his mind." He attempted sexual relations with children—"they charmed him purposely for that." He even became involved in a lawsuit on that charge. He could no longer exercise his profession and began to express definitely paranoid ideas: "he was hypnotized by his brother-in-law, persecuted politically." He had to be taken to a private sanitarium where he continually talked of auditory and olfactory hallucinations. "They put gas into his room, evidently so that he might not rescue the Jews." The patient is not and never was a Jew. Sometimes he showed great psycho-motor excitement. When he was calm he complained about difficulties of thinking and

exhibited stereotypy. After about eight months' stay at a private sanitarium, the patient was transferred for insulin therapy, in a condition as described. Beginning of the treatment with 25 units of insulin without visible effect. The patient is sometimes aggressive, sometimes very anxious. Paranoid. The following days with increasing doses of insulin the patient was absolutely quiet in the hypoglycemia, susceptible to contact, answered reasonably the questions about his hallucinations. For example: two hours after the injection of 45 units of insulin, he was quiet and passive: "Yes, I smell something, but evidently they have spilled formalin in the hospital." (True) "No, that was formalin before, now it is poison gas." With increasing hypoglycemia the patient made statements about the date of his admission to the hospital. An hour after the termination of the hypoglycemia he was restless, tense, expressed ideas of persecution and reference. The next day three hours after the injection of 50 units the patient lay in bed relaxed and calm for the first time, answered questions somewhat hesitantly, but already with a tendency towards insight into his illness. "What is the matter with you?" "One believes, one has delusions of persecution—perhaps one is sick—much is not natural." "What is not natural?" "When I dreamed and what I wished." "What was that?" "No, I thought I was a Jew, and yet I am a Christian—As a young boy I abused myself and was unchaste," etc. This time the patient remained calm somewhat longer, about two hours after the termination of the hypoglycemia, only to return to his earlier psychotic condition. Although it is not so evident from the description as it is at the bedside, yet even here one may observe that from minute to minute he was moving further and further from the delusions expressed just shortly before. One notices that the sense of the reality of the hallucinatory ideas is gradually broken down, but that he still shows indecision and doubt, even in the manner of expression, like a child who hides his uncertainty. "One might be sick." Since the shock dose had not yet been reached, the number of units was daily increased. Every day there was a repetition of the period of freedom from delusions during the hypoglycemia, and this was increasingly better in quality and longer in duration. By the fifth day the patient could take a walk, attended. In the evening he become psychotic again. By the ninth treatment he made friendly advances even outside the period of hypoglycemia. His

behavior was suited to the occasion. He was quiet and confident. He denied delusions and false perceptions and showed insight with regard to his previous delusions. On the next day two and one-half hours after the injection of 70 units the patient showed a reversal reaction. Until that time he was objective, quiet, free from hallucinations. Suddenly he began to talk volubly. Question: "What about the voices?" "They are silent, but the voice of conscience is not silent." Question: "What does that mean?" Answer: "I drank some water, and in the water was a fly which said to me: 'Thou shalt not kill' but I smashed the fly in a rage." The patient was somewhat restless, then became drowsy and slept. Fifteen minutes after the hypoglycemia was interrupted, he spoke laughingly about the voices he again had heard during the hypoglycemia for a few minutes. He had full insight about them. This experience was repeated daily. In every period of hypoglycemia the patient showed, I might say, in the same sequence a definite cross-section of his whole psychosis. One day he exhibited hypochondriacal features with delusions of being poisoned, on the next day ideas of reference and persecution, on the day following that he had ideas of rescuing others. On all these days the duration of these phenomena of activated psychosis became gradually shorter, lasting at most a few minutes. On the sixteenth day of the treatment they lasted only a moment, just before the interruption of the hypoglycemia. The patient said: "Doctor, I have just had another hallucination. I saw two men coming up out of the box and it seemed to me not at all unnatural, nor was I surprised at what they said. But it lasted not more than a minute." Except during hypoglycemia the patient was absolutely normal and not queer, but his treatment was continued because of the activated psychoses.

It will probably be interesting to introduce here the account given by this unusually intelligent doctor of his experiences before and after a deep coma which followed 115 units of insulin. Three hours after the injection the patient made many grimaces. Called, but no contact. Psycho-motor restlessness. Made ataxic movements with his hands. Spoke incomplete sentences. Perseveration. Entered coma. Babinski and Oppenheim positive, marked rigidity on the right side. Breathing deep and stertorous. Temperature low. Six hours after injection the hypoglycemia was terminated by 150 grams of sugar by stomach tube. Describes his experience as

follows: "At first I perspired profusely and felt very cold. To preserve my life I covered myself warmly with blankets. Gradually there came into my head noteworthy thoughts. Shall I obey the doctor or shall I not . . . . if I am mentally sick. . . . . Then I had a desire to cry out and run about. Then I thought again . . . . Scholar and crying don't go together. Then the people about me began to say the same thing. Then I saw a man coming with food and I had the feeling that everything was being pushed together in my head, I don't know exactly why. Then I began to be abusive . . . . and to move when the abuse had begun . . . . and when I moved, I thought to myself I might write it down for future reference—Then I was suddenly anxious lest I break my bones but had no control over myself." After the termination of the hypoglycemia, the patient had a very short interval of aphasia, his questions were unintelligible. After a few seconds he could be understood. "Is the shock over now? I feel a little better already. At first I swallowed all the letters. You see, I can speak more distinctly now. I always wanted to say something and couldn't. It was all shrouded as behind a veil. Speech became swallowing. Then I had an idea that one might call word-reference. Then I heard someone say: "Karl, Kiddies, Kitten, Coffer and referred it to myself." Four weeks after the hypoglycemic treatment the patient was lucid, calm, oriented, without any psychotic signs, and was discharged. He gave a complete catamnestic account of the psychosis he had experienced. It was naturally unpleasant for him to have been mentally ill, but speaking of his illness with physicians caused him no embarrassment. The patient returned to his previous professional work, which he has carried out to the present without interruption.

The cases cited are not the most favorable ones from the great number treated in the clinic. Of course, I have also had failures; in another group the treatment did not run such a satisfactory and direct course. And I have mentioned these cases, not because of the successful outcome but rather as clinical examples of the connection between alteration in psychotic pictures and hypoglycemia. I hope that I have succeeded to some extent in reporting the absolutely compelling impression, which one gains from personally observing the therapy, that beyond all doubt a causal connection exists between the hypoglycemic therapy and the improvement of the patient. No

longer has the psychiatrist the crippling sense of inadequacy that he used to feel toward psychotic patients. Now he is conscious of possessing an instrument which somehow can break through the wall and attack the psychosis, so to speak, at its heart. And that would be a great deal even if the statistical results were less favorable than they are. The material now includes about 300 cases of my own and as many or even more that I have observed jointly with others. When the patient's condition improves in one case after another in connection with this therapy, and when the improvement goes as far as recovery to an extent we are not accustomed to see in schizophrenia, we can only conclude that the improvement has been effected by the therapy. Such a regular sequence of events can no longer be ascribed to chance.

I shall now briefly outline the results. It is difficult to evaluate statistics in a disease like schizophrenia. Nevertheless I believe that in a group of cases as large as the one at my disposal, errors can be avoided at least with greater probability than in smaller groups.

I divided the material into three groups: those of less than six months' standing, those that had lasted from six to eighteen months, and those of more than eighteen months' duration. With regard to the successfully treated patients, the concept of full remissions was accurately defined and strictly applied. We admitted to this class only those patients who were altogether without symptoms and had complete insight. Furthermore, they must have been able to return to their former occupations, and they must have shown no personality changes on careful scrutiny. Under the heading of good remissions we classified those patients who were completely free from symptoms, showed insight, and did full work in their old occupations, but exhibited personality changes that could be grasped only intuitively. To the third group we assigned the social remissions, patients with only more or less improvement were not included in tabulating favorable results. With acute cases the therapy gave over 80% good remissions in which the patients were capable of following their occupations; out of these, 70% had complete remissions. With old cases the good results stand in inverse ratio to the duration of the illness. In this group over 40% remissions were obtained, good enough for the patients to be employed as before their illness.

Statistics on spontaneous remissions vary according to different authors from 5% to 25%. Thus the successful results in treated cases are several times as numerous as the most optimistic data conceded for spontaneous remissions. Moreover, a complete remission in the treated group stands qualitatively far above a spontaneous remission. When we consider these facts, we are justified in calling the therapy efficacious.

The impressive restoration of the personality seen in the treatment of acute cases led us at first to treat these alone and to neglect the older ones who had less chance of recovery.

On the other hand, in my institutional work I was more concerned with schizophrenia of long standing, and thus was forced to revise my point of view. I had a special opportunity to do this with the introduction of insulin therapy into the United States where I endeavored to work out a modification of the procedure suitable to old cases of schizophrenia. I shall report on this work at a later date.

If hypoglycemia is to be regarded today by the members of this convention as a useful therapy for psychoses, it is my hope that the present status of the therapy is not the end stage but rather the beginning of a mode of treatment which promises favorable results. Most of the problems connected with it are still awaiting solution. Perhaps this meeting will point out the direction to follow in the quest for their solution.

5. GENERAL DISCUSSION OF THE CARDIAZOL THERAPY

By LADISLAUS v. MEDUNA[1]

Since the publication of my first article in 1934 concerning the use of cardiazol, this method has been continually extending its conquests. The authors who have employed my method—even though they were only testing it—are proclaiming its great simplicity, its low cost, and its safety. These qualifications are of the kind to recommend it especially to institutions for use on a large scale. When I speak of the cardiazol therapy in general, com-

[1] From the Royal Hungarian State Institution for the Insane, Angyalföld. Director: Julius Nyirö.

parisons with the insulin therapy cannot be avoided. I must emphasize at the outset that my allusions to this other method, however critical they may sound, have in nowise the aim to present my method as its rival. On the contrary, I can appropriate without reservation—and I wish I could do so with full scientific conviction—the concluding words of Mr. Müller in the Fortschritte der Neurologie und Psychiatrie: "It would be silly to regard, as many have done, the shock treatment by insulin and that by cardiazol as rival methods whose results are to be played one against the other. Actually, they are two distinct therapeutic measures which may in the future come to supplement each other." To these words which show evidence of the greatest scientific comprehension, I can add only that I am far from holding the opinions to which Müller alludes.

As we all know, Sakel's method was developed on a basis of pure empiricism. To this day, it has no sound theoretical foundation. There are, to be sure, certain hypotheses which aim to arrange in an orderly system the particular phenomena of the insulin shock treatment, but the real nature of the cure and its mechanisms are still absolutely unknown. According to Sakel's theory there are inside the nerve cell pathways, higher and lower in the evolutionary scale. The higher ones are newer, more complex, and more sensitive. In the course of the schizophrenic process these are crippled, and the phylogenetically older ones become dominant. Under the influence of insulin shock these older ones are progressively weakened so that the cell has an opportunity to recuperate. Since this theory does not explain the nature of schizophrenia, it cannot throw light on the manner by which schizophrenia is cured.

The greatest weakness of this theory lies in the fact that anatomy knows nothing at all about these pathways that are supposed to differ phylogenetically. Therefore, to explain the successful treatment of schizophrenia, we must postulate provisionally a change in the endocrine status occurring during and after insulin shock, a change unfavorable to the schizophrenic process. This theory leads to a problematical conclusion which is, notwithstanding, very important, namely, that thorough investigation of the humoral changes during insulin coma may point the way to an understanding of the changes that accompany schizophrenia, or perhaps even cause it. The possibility of this suggestion is the greater since I

have developed my cardiazol treatment, for now two ways are open to the same goal. A comparison of the results obtained by the two methods may give rise to a new explanation of the nature of schizophrenia on a firmer basis of functional pathology. This will be a problem for the coming years. To make this somewhat obscure statement clearer, I beg to be allowed to recall the circumstances which led me to work out my hypothesis and my method. Among these circumstances are some which at first glance seem far from the subject and lacking in clarity but which gain significance after they are brought into a system.

The first concerns the somatic constitution. When a psychiatrist thinks of an epileptic, there comes to his mind the picture of a stocky, raw-boned man of athletic build with a massive head and powerful muscles. Outside of this type the overwhelming majority of epileptics belong, according to Kreyenberg, to the dysplastic type, according to Ilse Graf, by far most of them are of the athletic habitus; Hans Delbrück maintains that the epileptic is stocky, broad, and heavily built. When the same psychiatrist thinks of the typical schizophrenic patient, there will come before his mind's eye the asthenic-leptosomatic type. Of course I do not mean that epilepsy cannot crop out in a leptosomatic constitution or that an athletic build excludes schizophrenia. Nature does not recognize our rigid categories; she brings before us an endless multiplicity of transitional types. But when we construct a system, the only logical form of thought possible today, we must start with pure types, not with transitional forms. Consequently we may assume that epilepsy and schizophrenia, at least in their classical manifestations, are bound up with two opposite somatic types. To summarize my idea, I might say that the classical schizophrenic background consists at first sight of poorly developed mesodermal and sensitive ectodermal elements. In the classical epileptic, on the other hand, the stocky type, the over-development of the mesodermal elements is striking. To the view that the equilibrium between the two germinal layers is disturbed in opposite directions in the two somatic types, histology makes a very illuminating contribution. Alzheimer, Binswanger, Déjérine, Chaslin, Bratz and others have demonstrated that in the brain of epileptics the glia system not only takes the place of destroyed cells, thus substituting for the deficiency, but also frequently proliferates like a blastoma

and produces still more glial cells than would be needed to supply the loss of cells. Transitions from *sclerosis tuberosa* to actual gliosis are not wanting in the complete picture. These phenomena were known as early as 1917 to Karl Schaffer, the Hungarian histologist, and he regarded this activity of the glia system as an independent glial disease, in which hyperplasia was the chief symptom. On the other hand, Josephi, Miskolczy, and Horányi found that in brains of schizophrenic patients, the whole glia system was crippled by the schizophrenic process and was not only incapable of hyperplasia but could not even fill the place of the destroyed nerve cells. From the point of view of the habitus theory, it must be regarded as significant that in the two opposite somatic types there is an absolutely opposite behavior of the glia system, of the very connective tissue of the brain. Thus in cases of epilepsy and of schizophrenia we can see a contrast not only in their somatic types but also in the activity of their glia systems.

In this connection I may call attention to Telatin's work on metabolism, published two years ago. He found carbohydrate metabolism delayed in patients with schizophrenia and accelerated in those with epilepsy.

The facts that I have just mentioned were not sufficient in themselves as a starting-point for my work. Clinical observations were also necessary as suggested by W. Meyer-Gross' (Hdbch. d. Geist. Krankh. 1932) statement:

> "Up to the present no real combination of schizophrenia with genuine epilepsy, if one follows Krapf's strict definitions, has been described. E. Krapf (Epilepsie und Schizophrenie. Arch. f. Psych. 83. 1928) analyzed critically the twenty cases described in detail in the literature (Buchkoltz, Morawetz, Grise, Vorkastner) and found either signs of symptomatic epilepsy along with others simulating schizophrenia in cases of tumors, trauma, and other organic diseases of the brain; or he considered the epileptic nature of the seizures as unproved; or the diagnosis of schizophrenia as not at all dependable because of the short period of observation or because of failure to consider that atypical cases of epilepsy may present symptoms similar to those of schizophrenia."

In 1929 Professor Nyirö published the results of his study of the material in the Budapest hospital in Lipotmesö. He found 1.5% spontaneous recoveries among 176 epileptic patients. But, if the epilepsy was associated with a schizophrenia, 16% recovered. This 16-fold difference in the homogeneous material of the insti-

tution was so great that Nyirö could not help noticing it, and was forced to postulate an antagonism between the two diseases. A year later a German author, Georg Müller (Allg. Z. P. 1930), described two schizophrenic patients without delusions who regularly had complete remissions after spontaneous epileptic seizures. The author writes: "This beneficial influence on the course of the disease—namely, of the epileptic attack—reminds one very much of the favorable effect of an acute febrile illness on the course of a mental ailment. And this comparison seems especially to be justified because the beneficial effect is more likely to be observed in cases in which the illness is of recent onset and in those which run a stormy course. Perhaps we have here a counterpart to the glowing success of the fever treatment which reaches its highest point in acute cases of paresis, treatment which has recently been proposed for cases of schizophrenia." As may be seen from this reference, even in 1930 G. Müller had arrived at the idea which furnishes the basis of my theory and method of therapy, but he did not pursue the idea or work it out. A. Glaus (Z. Neur. 1931) examined 6000 cases of schizophrenia in the University clinic of Zürich and found altogether eight in whom there was also epilepsy. On the basis of a careful analysis of these eight cases, Glaus drew the conclusion that the preceding epilepsy made the outlook worse for the following schizophrenia in the sense that "a severe case of epilepsy, therefore, would make the onset of schizophrenia less likely than a light or cured case would." G. Steiner and A. Strauss go even further (Handbuch) when they declare that typical epileptic seizures are so rare in true schizophrenia that, in the cases where a record of that sort is found in the clinical history, there is justification for doubting the psychiatrist's diagnosis. For my part, I do not dare to take such a definite attitude, for doubtless cases are known in which both diseases run their courses side by side. However, these cases are among those rarities whose small number does not suffice to invalidate the authority of the recorded facts, and so I felt justified in setting up the following working hypothesis: *Between schizophrenia and epilepsy there exists a sort of biological antagonism which must be expressed in the pathological course of the two diseases. Without being able to characterize these pathological actions, I feel justified in asserting a priori that these courses are either mutually exclusive or they do,*

at least to a great degree, weaken each other in their mutual effects. Of course, I am well aware that just as there are several kinds of epilepsy so also schizophrenia may take numerous forms. We all know that schizophrenia may occur in the most diverse somatic types, but as we know from the work of Mauz, the type has an extraordinary significance for the patient's fate. Doubtless schizophrenia in persons of pyknic habitus will be more benign than in those of the leptosomatic-asthenic type. Only one scientific explanation can be offered for this phenomenon, namely, that the endocrine secretions of the pyknic type, their reactive character, their defense mechanism, are more suited to overcoming schizophrenic injuries than those of the leptosomatic-asthenic type. Unfortunately, we do not know the processes which determine the difference between the leptosomatic and the pyknic types, and therefore we can neither imitate nor produce the mode of reaction of the pyknic type to schizophrenia. In the case of epilepsy the situation is quite different, for we are able to imitate very well its chief symptom, the epileptic seizure and the endocrine changes that follow it. A large number of ways have been recommended to provoke epileptic seizures, beginning with absinthe and extending all the way to hyperventilation, but all have the disadvantage either of being dangerous to the patient, as, for example, the various poisons, or of being unreliable in their effect. Therefore, I found it necessary to seek a means that was perfectly free from danger on the one hand and offered absolute reliability on the other. This means I found in cardiazol (Knoll). Cardiazol (Knoll) is a circulatory drug with peculiar effect, the point of attack of which is chiefly the medulla oblongata. We have here to do with a means effective in two respects, the peculiarity of which lies in the fact that the effect changes qualitatively, depending on the dose, but the doses required to obtain the two qualitatively different effects are very different—usually the ratio is at least 1 : 5—so that the drug may be employed with the greatest confidence in internal medicine as well as in psychiatry.

In the customary therapeutic dose of 0.1-0.2 gram by intravenous or intramuscular injection, the drug is an ideal circulatory stimulant; but if this dose is increased five-fold there is a marked qualitative change in the effect, for the drug then reacts on the central nervous system and produces epileptiform convulsions,

which present a true reflection of the genuine epileptic seizures both in their clinical manifestations and in the endocrine changes following them. For example, the acidity of the urine increases about 26%, its ammonia content 14%, its phosphorus 10%, while the chlorides fall about 25%. Although these figures are only rough estimates, still they agree absolutely with those found in genuine epileptic seizures. The white blood picture shows a shift to the left exactly as in true epileptic attacks, or in any other violent muscular activity.

The method of the cardiazol treatment is remarkably simple. Men receive 0.5, women 0.4 gram in 10% solution intravenously. I emphatically recommend the 10% solution, for higher concentrations may be painful and may obliterate the veins after even a few injections. 1-2 seconds after the injection there follows a typical epileptic seizure. It lasts from 30-80 seconds. Since the attack begins with the opening of the mouth, there is ample time to insert a gag between the patient's teeth and so prevent the tongue from being bitten. After the seizure the patient goes to sleep for several minutes but soon regains consciousness. The best evidence for the simplicity of the procedure is the fact that 60-80 patients can be treated in one morning with the aid of only one assisting physician and at most two or three nurses.

I should also like to mention that this treatment of schizophrenia cannot effect a complete cure. For schizophrenia presents a psychic disorder based on a patho-physiological foundation, and, therefore, we must not only influence the biological patterns but must also seek to help the patient along psychological lines.

In connection with this, it is pleasant to think of Professor Klaesi's almost incredible success. Of course, other psychiatrists cannot expect to attain quite the same results as Professor Klaesi does with the combination of coma and psychiatric treatment, for this is a question not of method, but of an individuality, a personality, who can at best only be taken as a model but cannot be fully imitated.

In my clinic, the psychiatric treatment is as follows: After every fifth injection of cardiazol, the patient is examined by the senior physician. There I question him about his mental sensations and the changes in his mental condition. At the same time I take great pains to bring his gradually returning mental functioning

back to his earlier psychopathic sensations and to orient it in its disturbed state. The psychic condition of the patient subjected to the cardiazol treatment is like a sort of confused twilight state, for, at the beginning at least, the patient himself does not know which of his observations are pathological and which are not. The patient begins his recovery by noticing with uncertainty and mistrust the delusions that he once considered real. In this uncertainty we must help him. For almost every patient there comes a time in this period of mental clarity when I tell him frankly that he has been suffering from a mental illness. I consider the psychic management of the patient during the shock treatment so important that I have made control studies in some clinics in which the cardiazol treatment did not meet with such success as in mine. I also learned that in one such institution all the patients who were under the cardiazol treatment were put together in one ward, indeed in one room, with other patients. This arrangement, of course, not only very much disturbs the patients whose condition is improving but also, because of ever repeated psychic infection and new insults, considerably retards recovery. In another institution, 10-12 epileptic attacks were produced in the various patients without a physician giving them any attention; the patients were left entirely by themselves during the treatment and, after 10-15 attacks brought on in an absolutely perfunctory fashion, the patients were examined superficially. If the delusional manifestations still remained with possibly a slight diminution, then the treatment was either abruptly broken off or continued in the same routine way. It seems to me superfluous to emphasize that the treatment of schizophrenia can never be successful with mere medical treatment like an internal ailment, much as I am convinced of the purely material nature of this disease. The significance of the psychiatric treatment seems to me to be so far beyond doubt that I consider it unnecessary to look for justification. The fact is that those who have tested my treatment have not achieved my 50-60% success, but have had only 36-60%. The same authors, however, in testing Sakel's method, had an even lower percentage of remissions; indeed with both methods there was the same difference of 20-30% between them and the original authors. This difference I ascribe to their neglect of the psychiatric treatment.

As contra-indication to my method I mentioned in my original article diseases of the heart and arteries as well as intercurrent fevers. Since then there has been some change in this connection. Among the 500 patients so far treated, a single death occurred. This was a patient who already had aortic insufficiency and myocardial degeneration. With a heart so impaired no such strenuous measure should have been taken; this even a layman would be expected to know. Therefore this death should hardly be included in the results and casts no blame on the therapeutic method. Nevertheless I am having to treat a patient who shows in the electrocardiogram a slight myocardial degeneration, but I am doing so only at the urgent request of her relatives who are assuming full responsibility. But I should most emphatically recommend the utmost reluctance about treating such cases. The convulsion produced by cardiazol is altogether without danger as has been shown by the investigations of Dr. Lax at Budapest. His findings were as follows: "An E.K.G. was taken in 11 patients who underwent cardiazol therapy. Sometimes the E.K.G. was taken before, and sometimes after the convulsion. In 5 cases an E.K.G. was taken during the convulsion and then 10-15 minutes afterwards. We could find no noteworthy changes from the ones taken before the convulsions and serving as controls. As a further check, 8 patients had E.K.G.'s taken 2-4-6 or 1-3-5-hours after the convulsion. In 4 cases there was a minimal depression of the T-wave as compared with the records made before the convulsion. There was no change detected in the P-wave or ventricular complex in height or time interval, nor any alteration in the rhythm or signs of ectopic origin. In conclusion we may say: Up to the present our investigations seem to show no changes in the E.K.G. indicative of myocardial damage after cardiazol convulsions. These studies are being continued."

The statistical results of my treatment are well-known from my publications. In my first article I divided the patients according to Mauz into those in whom the pathological process was active and those in whom this phase was over. Today it seems to me more adequate to make distinctions between the newly developed, the subacute, and the chronic cases. The newly developed cases are those of not more than six months' duration, the subacute ones are those from 6-12 months' duration, and the chronic ones are those

of more than 12 months' duration. Although I myself observed no differences within the groups of cases of the same duration in regard to the psychotic type, I must mention the paper of Angyal and Gyárfás. They found that the catatonic and paranoid forms do better with insulin, the simple and the stuporous ones with cardiazol. They also combined the two methods, and in this way they could raise to 66% the 44% remissions obtained with cardiazol alone. Let me emphasize, however, that their success with cardiazol alone was not as good as mine, nor was their success with insulin alone as good as Sakel's.

Special attention is due to those cases which do not respond to one method of treatment but are cured by the other. I am studying now 10 clinical histories in which the insulin treatment properly conducted proved useless, while cardiazol, administered 1-2 months later, was successful. I am informed by private sources that a series of similar cases is known in Switzerland. Likewise, I know of cases which showed no improvement with cardiazol, but were brought promptly to a remission by the use of insulin. This very important finding seems to me to show clearly not only that the mechanism of the cure involved in the two methods is different but also that at least two forms of schizophrenia, with different pathological mechanisms must exist. Hence the importance of the fact that two different therapeutic methods are at our disposal. Cases that showed resistance to one of the two methods but later responded to the other, I call "crossed cases." I am fully convinced that endocrine studies of these crossed forms will lift the veil that still hangs over the nature of schizophrenia. I recommend to every physician, whose interests are more than practical and who wishes to advance scientific investigation, to include in his studies not merely one method but both. My idea is that part of the patients should be treated with insulin and part with cardiazol, and stubborn cases should have the latter method tried after the former or vice versa, the two methods being separated by a brief interval. Meanwhile we shall have time to undertake exact biological studies, and in this way we shall learn, perhaps, just what goes on in the organism during the treatment. For both methods a knowledge of the nature of these events and their chronological sequence is of the greatest importance. We must not forget that both insulin and cardiazol make powerful and brutal inroads into the organism,

which are quite alien to the schizophrenic process. Schizophrenia is not a biological catastrophe or a sudden endocrine strike, nor does it appear after an instantaneous block of the mesenchyme. It represents merely the logical result of a chain of chemical processes, concerning which we know nothing and can only make the academic assumption that they develop from a series of reactions conditioning one another. When these pathological trends reach a certain point or attain a certain intensity, the patient becomes schizophrenic. On this pathological but logically developed process we act with both methods as with dynamite, endeavoring to blow asunder the pathological sequences and restore the diseased organism to normal functioning. Furthermore, the brutality of both methods is certainly exaggerated on humanitarian grounds. But let us recall the excitement shown on the part of the profession when we began to treat general paresis with malaria inoculations. And today even the simplest-minded villager finds the malaria treatment quite natural in spite of the fact that the number of casualties resulting from it is still relatively high. Beyond all doubt, from biological and therapeutic points of view, we are undertaking a violent onslaught with either method we choose, because at present nothing less than such a shock to the organism is powerful enough to break the chain of noxious processes that leads to schizophrenia. I hope that in the future, as our study of the "crossed" forms progresses, we shall reach a point where it will not be necessary to break the series of events leading to schizophrenia with brutal force. Then we shall be able to discard the shock and coma of the insulin treatment and the epileptic seizure of the cardiazol treatment. Instead we shall provoke directly the slow chemical processes that can now be stimulated only by the explosive mechanisms of the two methods of treatment.

6. THE PHYSIOLOGY OF THE HYPOGLYCEMIC SHOCK IN THE TREATMENT OF SCHIZOPHRENIA

W. BEIGLBÖCK [1] AND TH. DUSSIK [2]

The subject that we have the very great privilege of discussing here today is so broad that we have had to limit it to the barest

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essentials. On general principles, therefore, we shall refrain from giving a full account of the voluminous bibliographical data that have appeared in recent publications, although we must, at the very beginning, express our gratitude for what the Swiss investigators have contributed to our knowledge of the effects of insulin. We shall mention only the extensive researches of Staub and his school, the work of Demole, and the observations, made from the special standpoint of the treatment of schizophrenia, by Müller, Georgi, Hadorn, and Schmid, which have made definite contributions to our knowledge.

The fact that hypoglycemia was formerly anxiously shunned because of isolated unfortunate incidents among diabetic patients is undoubtedly responsible for the paucity of our information on the effects of lowering the blood sugar in man. Researches were almost entirely confined to animal experiments and dealt chiefly with questions on the physiology of metabolism.

Then Sakel's announcement of the treatment of schizophrenia by high doses of insulin forced us to reopen the question on a new basis, to study the changes that take place in the body so that we might better understand the mechanism of the effects and learn how to avoid accidents or control them. This was first of all the object of our studies, and no attempt was made to establish connections with the therapeutic effect. We believed that this could be undertaken with greater hopes of success after elucidation of the physiological phenomena.

Our results are based on researches carried on in Vienna for over a year in close cooperation with the neurological clinic (Prof. Pötzl) and the Medical Clinic I (Prof. Eppinger). My colleague, Mr. Dussik, gave most of his attention to the hypoglycemia-shock clinic, while it fell to my lot to work on the chemical and biological problems, which I tried to solve with the help of several assistants. We have not yet communicated our findings in detail. Such an account must come later. Today I shall merely make a report in connection with them in the hope of being able to impart something new. I shall try especially to fit together into a unified structure our results and those reported in the literature and thus, as I believe, gain a new point of view regarding this question.

If insulin is given to a fasting person, some time passes before there is any effect. After about an hour, or even a longer time,

the first signs become evident. These consist of restlessness, nervousness, weakness, uncertainty, a sense of hunger and often even of nausea, and increasing apathy. Then follow profuse perspiration, trembling of the hands, increasing restlessness, and changes in color. Flushing and pallor may alternate, but often the face remains flushed for a long time and the flush spreads even to the trunk and extremities; the lips are noticeably red, and one has the impression that all the capillaries are dilated. If one presses on the skin the color recedes but returns with amazing speed after the pressure is removed. The pulse rate changes, sometimes to tachycardia, but usually to bradycardia of a most unusual degree. At the same time the pulse is often tense; the carotids pulsate violently, and blood pressure rises. It is true, this is not regularly the case, but there is an increase in amplitude, that is, in the difference between the systolic pressure and the diastolic. The last mentioned may become quite remarkable. We once observed in a nephritic patient, who was getting insulin because of other indications, a rise of systolic pressure from 175 to 245, a fall of diastolic pressure from 105-65, that is, a rise in pulse pressure from 70 to 180. At the same time there is no correlation between pulse and blood pressure. These phenomena of the circulation usually disappear after a time; the flushing of the face passes, with protracted shocks the pulse may become very rapid, the blood pressure may fall, a marked cyanosis may appear,—in short, the symptoms may be reversed to the opposite (due, perhaps, to final central paralysis of the regulatory mechanism?). Then there is danger in the delay . . . . At any rate, with prolongation of hypoglycemia, the central nervous system manifestations become more evident and dominate the picture in their multiplicity and impressiveness. It would be presumptive to speak of them here. The sweating continues—aside from the rarer forms of so-called dry shock—often becoming almost incredibly profuse and frequently accompanied by marked salivation. Respiration shows less striking alterations; it is at first usually accelerated, then deepened. Cheyne-Stokes breathing is observed only in rare cases.

If we try to give an intelligible explanation of the mechanism causing these manifold phenomena, we shall succeed only if we correlate a large number of methodical studies. We must start with

the one established and visible effect of insulin, its effect on the blood sugar. It is known that the blood sugar falls because the sugar supply from the liver to the blood is shut off and because the cells take up more sugar. Whether this is to be attributed to more rapid conversion of the free sugar in the tissues and consequent more rapid withdrawal from the blood (Macleod) or to increased wall-permeability to sugar (Höber, Löwy), is still unsettled and is not important for our purposes. We can only say with certainty that when the sugar has reached a low level (with individual variations, of course), then circulatory symptoms begin after the first nervous symptoms. In the heart itself we can demonstrate changes by means of the electrocardiogram, changes the significance of which is still undetermined. Since this subject will be discussed here from the specialist's point of view, I shall merely mention a few of my own observations:

1. A flattening of the T-wave may occur without exogenous administration of insulin, as I observed in a case of spontaneous hypoglycemia which I have already reported.

2. The flattening of the T-wave in insulin shock is never influenced by oxygen inhalation, sometimes is influenced but not always by intravenous injection of dextrose. One must, we believe, consider that there is an increased amount of work demanded of the heart during hypoglycemia. We must also point out something that, so far as I know, has never been considered in judging changes in the heart, namely, the withdrawal of potassium salts from the blood into the tissues. Since we know that potassium has a significant influence on the heart, we must reckon with this ionic shift, about which I shall speak in greater detail a little later. This is, of course, only a hypothesis, because our researches with regard to it have as yet only begun. At any rate, the electrocardiographic changes seem to indicate that the heart muscle suffers in hypoglycemia. This becomes all the more significant when we consider that at the same time a greater load is put upon the heart, for in a large majority of cases a definite rise in pulse volume is observed. This can be concluded from the increased blood pressure amplitude. It can also be determined directly. Lauter and Baumann were able to demonstrate an increase of 15-45% by the gas method, and my own studies with Siedek (after Brömser) showed a rise of 10-15%,

although not in all cases; in fact, only when the normal person used for the experiment showed marked evidence of hypoglycemia. The minute-volume rises more or less according to the pulse rate. The highest value observed is 60.2% (Lauter and Baumann). This has usually been described as resulting from a compensatory discharge of adrenalin, and many experiments seem to support this view. But the fact that the blood sugar does not always parallel the increase in volume and further that there may be no tachycardia admits of the explanation of Lauter and Baumann, who think that it is to be looked on as an adaptation of the circulation to the blood sugar, quite analogous to the reaction of the circulation to lack of oxygen.

Surprisingly, however, the volume of the circulating blood is diminished as has been shown by earlier work and by my own studies. We were able to prove this as well by the carbon monoxide as by the Congo red method. This diminution concerns especially the plasma volume and is evidently caused by the extreme dehydration, for it was lacking in a case of dry shock.

But when the volume of the circulating blood drops and the pulse rate is not markedly increased although the blood volume is lowered, the cause can lie only in a great diminution of the total diameter of the vessels, for which we have no certain evidence, or in an increase in the velocity of the circulation. This latter is, in fact, the case. This can be inferred as well from the increased oxygenation of the venous blood as from the direct determination of the velocity with the dye method. With Congo red we regularly found a great diminution in the circulation time.

The oxygenation of the venous blood is noticeably increased and may even equal that of arterial blood as Holzer and Klein have already shown. My own studies support these findings.

This fact can be used as a measure of the circulatory rate provided the oxygen consumption does not decrease at the same time. Studies in basal metabolism, which are, of course, of value only insofar as they measure the oxygen requirement, show that actually more oxygen is consumed. Lauter and Baumann, using most exact methods, were also able to demonstrate increased consumption of oxygen. Therefore, the increase in the oxygenation of the venous blood may be used as a direct measure of the circulatory rate.

In passing judgment on the results of the gas analysis we must bear in mind that hypoglycemic shock of any depth is accompanied by a definite increase in erythrocytes. The hemoglobin and hematocrit values rise also but not as much as the red cell count, if we may judge from investigations that are not yet completed. Moreover, there is an increase in pH. Both these changes, as is well known, tend to diminish the release of oxygen in the capillaries.

The increase in the concentration of the blood seems to be primarily due to dehydration as the lowering in the plasma volume and the rise in total serum nitrogen show.

One of the most important findings is the shift in pH to the alkaline side, which we were able to demonstrate in almost every case. This is explained principally by the liberation of carbon dioxide. It could be detected by colorimetric methods as well as by quinhydrone. Our investigations, carried out in collaboration with Sinnreich and Steinlechner, show the presence of alkalosis in hypoglycemia to a degree that, so far as we know, has not been produced in other conditions. Thus hypoglycemia makes a violent assault on the hydrogen ion concentration which is normally so delicately preserved.

It is quite possible that on this change a whole series of others depends, for example, the change in the leukocytes. Since the work of Hoff we know that acidosis leads to a leukocytosis, while alkalosis leads to lymphocytosis. Now in insulin shock, we know that the lymphocyte count is absolutely increased. Not until later do we see a leukocytosis. Usually in the course of the shock the pH returns to a lower level. It is conceivable that the leukocyte reaction is so sensitive that it occurs before our method of pH determination can show the change. Of course, this is still only a hypothesis. Further study on this point is urgently needed. If it is permissible to draw a conclusion from the opposite, namely, from acidosis of the blood, and taking into consideration that the number of eosinophils is increased in insulin shock but decreased in anaphylactic shock, our hypothesis gains in probability.

In the ionic content of the serum there are also characteristic changes, remarkable at least by their magnitude. It was discovered by Kerr and later emphasized by Georgi that the potassium content of the serum falls, and very often falls to a considerable degree. The sodium content is shifted in the opposite direction.

An increase in the chlorides is usually reported in the literature, but in our hands there was no significant change although the trend was upward. We must bear in mind that the loss of chlorides of the body is enormous. Salt is eliminated with the sweat, thus sodium and chloride are lost. The loss of chloride in the gastric juice is great. In the gastric juice we find an acidity surpassing all usual values. This hypersecretion and hyperacidity was formerly associated with the shift in pH. If we take into account this chloride loss along with the maintenance of the chloride concentration in the serum, we must postulate an influx of chlorides into the blood.

The calcium sometimes rises but more often remains constant. Other authors report marked increases. But the important factor is not the total calcium, it is the relation between the ionized and un-ionized portions. Here, too, systematic investigations are needed.

Likewise, magnesium is not uniformly affected in its total concentration. Concerning the inorganic phosphates we know from many reports that they decrease in hypoglycemia. Our own study of this subject has only just begun.

The ionic shift becomes somewhat simpler in the light of Keller's electrostatic theory. This theory starts with the assumption that the serum is negatively charged, the cells positively charged. Now certain ions show a tendency to take positions in the serum while others show a preference for the cells. It will suffice here to take Na and K as an illustration of these opposite tendencies. The red cells are rich in K, poor in Na while in the blood plasma exactly the opposite relation holds. The researches of Keller and his students have shown that there exists a group of ions endowed with a tendency to migrate toward the cells. These ions are: sugar, urea, the phosphates, potassium and the un-ionized portion of the calcium. The second group, which tends to migrate toward the plasma consists of sodium, chlorides, the ionized calcium and magnesium as well as many aminoacids.

Now we are familiar with pathological conditions in which this normal direction of migration is reversed. Sodium enters the tissues, while potassium moves out into the serum. Such a condition is, for example, anaphylactic shock. Here the ionic shift is sudden. The same thing, only more slowly, takes place in a great

number of diseases grouped by Eppinger under the heading of serous inflammations. In a series of studies he and his students have demonstrated this ionic migration in such conditions.

In insulin shock, as appears from the foregoing discussion, the picture is exactly the opposite. Consequently we are dealing here with a mirror image of serous inflammation and particularly of anaphylactic shock. Since the pathology of serous inflammation can be safely assumed to be a thinning of the cell membrane with increased permeability to proteins, we must expect after insulin an opposite state of affairs. The investigations concerned with this problem are still few. All the available data, however, support this view. We have, for instance, the work of Petersen and Müller with thoracic duct fistulae in dogs and that of Hoff on the mechanism of the action of euphyllin. We ourselves were able to show that insulin hinders the escape of potassium from the erythrocytes which takes place when blood is allowed to stand for long periods of time. We hope we shall soon be able to offer further contributions to the solution of this problem as well as to the measurement of electric potentials.

With this manner of approach we think we have found the proper starting point for the understanding of the physiology of the insulin shock. Its effects can be grasped in no way better than by contrast with those of the anaphylactic shock. In almost every respect the two types of shock are opposed.

In this way too, perhaps, there will be opened in the future a still greater field for the therapeutic use of large doses of insulin. At least we hope these lines of thought will furnish a new impetus to research.

The effect of this ionic migration on the central nervous system is to be sought not only in the sugar deficiency but also along the lines laid down by Georgi, who ascribed a leading role to the K/Ca-quotient. This value, as Fisher, Fisher and Cloetta proved is altered in sleep and in narcosis. In one case, in which a fatal outcome followed insulin shock, analysis of the brain showed a K/Na-quotient higher than Kaunitz ever saw in a large series of investigations of other cases. While a single finding must be judged with the greatest caution, it also shows the same trend for every case. These problems must be pursued further in animal experiments.

With this I believe I have said what there is to say at present about the physiology of the insulin shock.

If you will permit me to say a few words, as a sort of epilogue, about my rather varied experiences as a medical consultant for insulin cases at the Vienna Neurological Clinic, I may perhaps be able in that way to give you a few practical hints:

1. We saw disturbances in sugar regulation in 3 cases immediately following the completion of the insulin therapy. In only one of these was it extreme and was reflected in the sugar tolerance curve and in that of adrenalin and insulin. A year later we were able to follow up this patient and found that these values had returned to normal. All the other patients whom we were able to follow showed nothing striking in this respect. In animal experiments, after rather extended periods of insulin shocks, one finds in the pancreas histologically enormous hypertrophy of the islands of Langerhans as substantiated by our own researches with Schachner. In fact, the three patients mentioned showed a condition similar to that of a case of spontaneous hypoglycemia which I followed carefully, and to the condition of two cases of Mansfeld-Effect with occlusion of the pancreatic duct by a tumor—cases that my coworker, Steinlechner, will publish.

2. In 4 cases I saw acute nephritis, twice as a sequel of tonsilitis. These showed the typical picture of glomerular nephritis and had nothing to do with the insulin therapy. The other two were quite atypical and followed severe epileptic seizures in the shock treatment. In spite of a rise in blood pressure and rest nitrogen as well as a quickly receding hematuria, they showed no excretory disturbance, although there was a marked and rather lasting disturbance in the concentration capacity. Since they were very unusual types of kidney damage which soon disappeared without sequel, and since no focus of infection was found, we are inclined to connect them with the insulin shock, especially because hematuria has been reported in a diabetic patient after insulin. Disturbances in kidney permeability caused by insulin are known. In particular, our insulin-poisoned guinea pigs showed extensive damage of the kidney epithelium in the form of fat droplets. (Research with Schachner.)

3. One patient who did not wake up for two days after an epileptic shock, showed a disturbed water balance without any kidney

damage; it seemed to be a case of primary oliguria. Retention was strikingly lessened by pituitrin. Pick produced a similar retention experimentally by cerebral narcosis. Since we found this patient's spinal fluid xanthochromic 10 days after the last shock, we believe that the oliguria was of cerebral origin. The disturbance disappeared after two weeks.

4. The most frequent and acutely dangerous complication so far observed is pulmonary oedema, which I saw four times. Its occurrence is not difficult to understand, because in insulin shock circulation is accelerated; if, in addition, there is left-sided failure, and our knowledge of the myocardial changes suggest that this may be expected, then the conditions are favorable for pulmonary oedema. Strophanthin has proved a sovereign remedy in such cases; it was used along with venesection and a plentiful supply of oxygen.

5. Next to all heart diseases, the most important contraindication is hyperthyroidism which almost always gives an unsatisfactory reaction. This may be accounted for by the fact that in this disease there is generally serous inflammation of the myocardium (Eppinger) and a rapid circulation caused by the very nature of the malady.

6. Since adrenalin affects the heart in the same direction as insulin increase of the pulse volume, I should advise caution in its use although to my knowledge no damaging effect so far has been observed.

(We shall describe our observations concerning complications of the hypoglycemic shock in still greater detail.)

If I have succeeded in arousing in you some interest in the study of the physiology of the insulin shock and have given you some indications as to the complications observed, this work of ours has achieved its purpose.

7. DEMENTIA PRAECOX, HYPOGLYCEMIA, INSULIN, VITAMIN B_1

By V. DEMOLE, Basel

The curative effect of insulin in dementia praecox as brought forward by Sakel leads us to study the modifying agents of the insulin action with the hope of improving the therapy and explaining its mode of action.

The influence of Vitamin B_1 (Aneurine) on the intermediary metabolism of the carbohydrates has been the object of important studies. We shall briefly review the results of some of these investigations. Having studied the effect of this vitamin on the insulin hypoglycemia, we are going to summarize here our investigations which we began in April, 1936.

A sufficient dose of Vitamin B_1 cures beriberi in man and the experimental avitaminosis B_1. This avitaminosis is characterized by three kinds of symptoms:

1. Nervous (asthenia, paresis, neuritis, and, in the ultimate phase, tonic contractions and convulsions);
2. Circulatory (bradycardia, oedema);
3. Intermediate metabolic changes, mainly in the field of carbohydrates.

It is important to point out here a few salient facts. An excess in the intake of carbohydrates accelerates the appearance of avitaminosis B_1. This acceleration is particularly evident in pigeons afflicted with polyneuritis. *In vitro,* fragments of organs (liver, kidney and muscles and particularly brain) or ground tissues of animals suffering from avitaminosis B_1 consume less oxygen than ordinarily. Moreover, they are incapable of normal metabolism of the carbohydrates, which is demonstrated by their high content of lactic and pyruvic acid. The adding of Vitamin B_1 to these tissues reestablishes their normal capacity of oxidation.

The quantity of ketone bodies increases in the blood, cerebrospinal fluid, and in the urine of patients and animals affected with avitaminosis B_1. One also finds pyruvic acid and methylglyoxal. The administration of Vitamin B_1 causes the disappearance of these products of deficient intermediary metabolism of carbohydrates.

It is the methylglyoxal that Vogt-Moller thought to be responsible for the nervous symptoms of avitaminosis B_1. This substance provokes an intoxication which in certain respects resembles the varied acute convulsive symptoms of avitaminosis B_1 which are analogous to the convulsions caused by the insulin hypoglycemia.

The alteration of the metabolism of muscles by iodacetic acid or insulin provokes the appearance of pyruvic acid and methylglyoxal. In contrast to dioxyacetone which is capable of checking the insulin convulsions, pyruvic acid and methylglyoxal increase them (Barrenscheen-Kermanck). Silberschmidt, in reviewing the facts re-

garding the action of Vitamin B_1 on the physiology and pathology of the organism, points out that the hypoglycemic convulsions might perhaps be attributed to the formation of pyruvic acid and methylglyoxal or to other intermediate substances of the sugar metabolism.

We have studied experimentally the effect of Vitamin B_1 on the insulin hypoglycemia in normal animals, and on the insulin hypoglycemia of rats affected with avitaminosis B_1. Here are the results of our experiments performed either with concentrated Vitamin B_1 or with synthetic Vitamin B_1 (Benerva "Roche").

FIGURE 1.

THE ANTI-HYPOGLYCEMIC AND ANTI-CONVULSIVE EFFECT OF VITAMIN B_1 IN NORMAL RABBITS INJECTED WITH INSULIN (1 U.I. PER KILOGRAM SUBCUTANEOUSLY).

Number of animals	Animals in which hypoglycemia		Animals with convulsions	
	Does not reach 50 mg.%	Falls below 50 mg.%	Transitory, recovering spontaneously	Violent, necessitating the use of glucose to save the animal
Treated with B_1 13	5	8	1	1
Controls 16	0	16	1	10

1. INFLUENCE OF VITAMIN B_1 ON THE INSULIN HYPOGLYCEMIA

In these experiments we used forty animals, some of which were used several times. The amount of insulin varied from $\frac{1}{4}$ to 1 international unit (U.I.) per kilogram of body weight. It is with the latter dose that one obtains the most satisfactory results.

As an example, we tabulate (Figure 1) the results of one of our experiments on a group of twenty-nine rabbits, out of which sixteen were controls and the other thirteen were given, during the preceding twenty-four hours, four hypodermic injections of five hundred U.I. of Vitamin B_1. In the sixteen control animals the injection of one unit of insulin provoked a fall of the glycemia below 50 mg.%; five rabbits tolerated the hypoglycemia without convulsions. The remaining eleven rabbits had hypoglycemic convulsions. Out of these animals only one recovered spontaneously.

In the other animals the convulsions were extremely violent. It was necessary to inject glucose to save the animals.

In thirteen rabbits injected with Vitamin B_1, the blood sugar remained above 50 mg.% in five animals and below 50 mg.% in eight animals. Only two rabbits had hypoglycemic convulsions, one of which recovered spontaneously. It is interesting to note that in rabbits which were treated with Vitamin B_1 and recovered spontaneously, the insulin hypoglycemia lasted less than seven hours. On the contrary, in most of the control rabbits the insulin hypoglycemia was of more than seven hours' duration.

The results of these experiments, substantiated by other investigators, show that Vitamin B_1 not only diminishes the frequency and intensity of the insulin hypoglycemic convulsions but it also shortens the duration of the hypoglycemia. Apparently the antitoxin effect of Vitamin B_1 should be attributed to the activation of the intermediary metabolism of the carbohydrates, which activation interferes with the formation of convulsive toxic substances, or it rapidly decomposes these substances which form during the coma.

2. The Effect of Vitamin B_1 on the Insulin Hypoglycemia of Rats Affected with Avitaminosis B_1

Wien has shown that the insulin hypoglycemia of young rats is not influenced by the deficiency of Vitamins A and D, but that the deficiency of Vitamin B_1 increases it considerably. The subcutaneous injections of $\frac{1}{2}$ unit of insulin per kilogram body weight provokes in normal rats a transitory decrease of the blood sugar down to about 50 and 70 mg.%, which disappears within four or five hours. In animals with a deficiency of Vitamin B_1, this hypoglycemia lasts over five hours. Sometimes one is confronted with the occurrence of hypoglycemic attacks in these animals. We were able to verify these results by varying the conditions under which the experiments were performed. In case of a very pronounced avitaminosis B_1, insulin provokes in most rats a hypoglycemia which is more accentuated than in normal rats. The rise of the blood sugar to the normal level is delayed. After recovery caused by the subcutaneous administration of Vitamin B_1 the animals react normally to insulin. Vitamin B_2 (Lactoflavine) has no influence on the insulin hypoglycemia in rats with deficiency of Vitamin B_1.

These experiments show that Vitamin B_1 activates the reestablishment of the normal glycemia and exercises an antitoxic influence on the symptoms of the hypoglycemic coma.

The facts which we described appear to be in accord with certain clinical data. Labbé, Nepveus, and Gringoire have shown the favorable effect of Vitamin B_1 on certain toxic hypoglycemic symptoms and Freudenberg has utilized this Vitamin to help schizophrenic patients treated with insulin to recover from the hypoglycemic coma in case the administration of glucose through the nasal tube remained without effect.

What is the mode of action which would explain the therapeutic effect of insulin in dementia praecox? On the basis of the hypothesis that dementia praecox is caused by certain toxic substances, perhaps of digestive origin, which deflect the influx of nerve energy, Sakel believes that the insulin treatment intensifies the defensive capacity of the liver or of the brain by modifying the permeability of the cells of the vegetative or of the central nervous system. Georgi attributes the therapeutic effect of insulin to modifications occurring during the coma, but his investigations concerning the leucocytosis, the sedimentation of the red cells, the blood content of cholesterol, calcium, and potassium, give results which do not permit us to draw definite conclusions. Müller wisely proceeds by elimination. Neither the hypoglycemia, nor the somnolence during the coma, nor the psychic effect of the shock, furnish satisfactory explanations.

It seems to us useful to appeal to the influence of insulin on the intermediary metabolism of glucose to explain its therapeutic effect in dementia praecox. The hormone of the pancreas probably provokes, during the hypoglycemia, oxybiotic processes which are necessary for the detoxication of the nerve cells by favoring the combustion of the toxic substances which are responsible for the pathology of the thinking processes. In admitting that the point of attack of insulin is localized in the intermediary metabolic system of glucose, it seems logical to connect closely the pathogenesis of dementia praecox with the alteration of the fermentative processes. On the whole, one deals with the diastasic excitation of the respiration of the cerebral tissues (functional alteration) without alterations in the primary microscopic anatomical substratum. This hypothesis offers the advantages of creating a field of research in

which biochemical investigations and biological and clinical studies can be carried out.

The modifications of the intra-cellular oxybiotic processes (which we consider as the active agents in the treatment of dementia praecox) perhaps constitute the links uniting different therapeutic methods which have been advocated successively: the stimulation of the nerve centers by cyanide and carbonic acid (Loewenhart, 1916 and 1929); the sleep treatment (Klaesi, 1921), the favorable effects of which we were able to appreciate (Demole, 1921); the insulin treatment (Sakel) and the convulsive treatment (Von Meduna, 1937).

With cyanide, Loewenhart necessarily modifies the cerebral oxybiotic processes. The rest caused by the sleep treatment is probably not the only effective agent. Hypnotics and narcotics *in vitro* exercise an influence on the tissue respiration and alter the capacity of oxidation (Jowett, Quastel). In the treatment with convulsions, one may assume that the intensive excitation provokes changes in the oxidation processes, perhaps a local combustion of the waste products which is useful for the reëstablishment of the normal tissue oxidation.

Frogs mildly intoxicated with cyanide become hypersensitive to cardiazol (Labes, Wedell, Soehring). During the convulsions cardiazol provokes a hyperglycemia probably of suprarenal origin and an increase of lactic acid in the blood (Bömer). We have observed that certain analeptic substances provoked in rabbits during the convulsive crisis a hyperglycemia which may reach 200 mg.%.

The detoxication provoked by insulin in varied pathological conditions (morphin-amania, puerperal toxicosis) is apparently closely related to the disorders in the carbohydrate metabolism.

What is the place of attack of insulin? Does it affect the external membrane of the nerve cell or its protoplasmic content?

It probably acts on the internal part of the cell because the pancreatic hormone modifies the tissue respiration, and the oxidation processes are necessarily localized in the protoplasm. The comparison with the localization of functional lesions observed in experimental beriberi is instructive. In its full development this avitaminosis in rats is characterized by the appearance of tonic and clonic convulsions. The animal assumes abnormal attitudes, the head is deviated laterally or is in opisthotonus, the tail stiffens, the

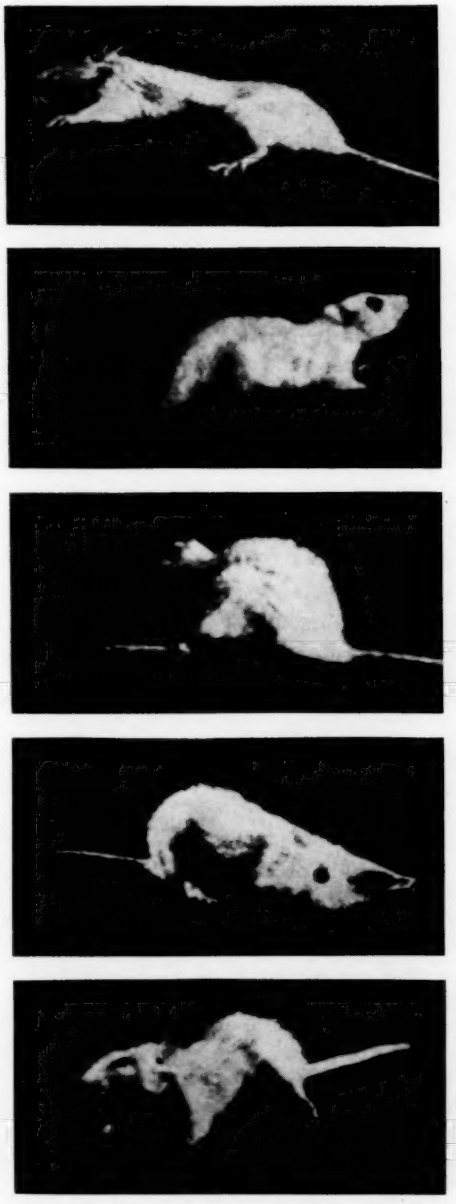


FIG. ii. Avitaminosis B_1 in the rat. Convulsions.

legs are wide apart, the back is arched. It trembles, wobbles, falls on its side, is combative, and turns over and over (Figure ii). This symptomatology, similar to that in hypoglycemic convulsions, may be attributed, as investigations *in vitro* have shown, to the alteration of the respiration of cells. The catabolism of carbohydrates in the protoplasm is interfered with or perverted. This abnormal state is reversible. The illness is rapidly curable. The addition of Vitamin B_1 *in vitro* restores the tissue respiration. Its administration to the animal cures it within a few hours. These facts are significant not only for comparison. The similarity of the biochemical processes is evident. *In vitro* one finds in the tissue treated with insulin certain abnormal products of the intermediary metabolism which products one also finds in the live tissues of the animal affected with beriberi. The therapeutic action of the pancreatic hormone in dementia praecox appears to be due to its effect on the intracellular oxidative processes.

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8. THE PROBLEM OF CONVULSIONS AND INSULIN THERAPY, I

By F. GEORGI *

Consideration of Various Aspects of Clinical and Humoral Pathology

The old yet ever new demand for a psychiatry deeply rooted in internal medicine has become insistent as a result of the recent therapeutic researches which form the subject of this conference. Although, after the introductory report of Dr. Max Müller, there could hardly be any room for doubt that a systematically conducted insulin therapy as well as the convulsion therapy—according to other reports—may lead to the weakening, yes, even to the complete collapse of the schizophrenic mechanism, still we must admit that up to the present we have been dealing with a purely empirical procedure. In spite of the clinical experience of internists, we lacked criteria of a pathophysiological nature which would have permitted us to draw retrospective conclusions with regard to therapy and prognosis. Moreover, only vague guesses could be given concerning the mechanism of the healing process.

We face this negative balance although more than half a decade has passed since the first attempt to gain an influence over the schizophrenic process. I remember in this connection above all the first valuable tests of H. Steck. The researches carried out with wonderful success by Sakel and his co-workers, as well as Meduna's efforts, are responsible for the systematic investigation from every angle of the pathological and physiological processes following large doses of insulin and of cardiazol.

Our first studies, undertaken a year and a half ago, showed:

1. That we were facing great new problems and perspectives.

2. That, because of individual variations in reaction, only concerted studies, carried out on a large scale, of isolated cases would advance us, and

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3. That it was scarcely possible, considering the nature of the subject, to discover laws and draw valid conclusions without the help of co-workers.

My former assistant, Dr. F. Zimmermann, Dr. Strauss (Waldau-Bern), and I asked ourselves the following questions:

1. What is the state of the organism, quite apart from the problem of schizophrenia, after large doses of insulin?

2. Do the data so far collected admit of conclusions regarding the therapeutic effect?

3. What is the state of the organism, again independent of the problem of schizophrenia, after large doses of cardiazol?

4. Do these data admit of conclusions concerning the treatment of schizophrenia?

5. What constitutes the difference, at least in the general pathological and physiological processes, between the two new therapeutic measures?

6. On the basis of the answers to questions 1-5, is it possible or even desirable to combine the two methods?

This is not the place to go into details [1] about our material—we made several thousand blood studies—but instead I must confine myself to a brief summary of our most important findings.

Altogether 450 blood sugar determinations were made on five patients in the course of the insulin treatment, using the Hagedorn-Jensen method. Every patient had 10-14 determinations made weekly, always on the same day of the week, with the following results:

1. The greatest fall in the blood sugar often took place within the first half hour, without any evidence of the so-called hypoglycemic phenomena which one would expect to appear, according to Umber.

2. The lowest level of the blood sugar, or a point close to the lowest level, usually appears in the third half hour after the injection, quite without regard to the dose.

[1] I refer in this regard to the next paper by Georgi and Strauss as well as to a monograph by F. Zimmermann, soon to appear from the press of Orell Füssli, Zürich: Clinical and Serological Studies after Large Doses of Insulin. Comparative studies with different insulin preparations (Insulin Richter and Insulin Sandoz) convinced us of their equal value.

3. Even without the administration of carbohydrate, the blood sugar usually rose anew in the course of the second, or at least at the beginning of the third hour after insulin, and frequently reached the double of the earlier low level.

4. Apart from light sleep, perspiration, and epileptiform convulsions, we could not observe the classical physical or psychic symptoms of insulin intoxication until after the blood sugar had passed its lowest point and risen again. Not always, therefore, but very often, the rise in the blood sugar parallels the appearance of the so-called hypoglycemic symptoms.

5. In the course of weeks individual patients developed the well-known sensitization to insulin so that toward the end of the period of treatment, with the same or smaller doses of insulin, the blood sugar fell more markedly than it did at the beginning, and, above all, remained at the low levels for a longer time.

6. No conclusions as to the level of the blood sugar can be drawn from the absence of any clinical symptom. According to Wilder the mild attacks of glycopenia occur with a blood sugar value of 65-80, moderate attacks with 50-70, severe ones with less than 50, and unconsciousness with less than 35 mg.%. According to our determinations, this, even if one grants many exceptions, is entirely untenable. In the majority of our cases the blood sugar value, in the so-called second phase, after a very short time, sank below 60 mg.% without the slightest symptoms of a mild glycopenic attack.

7. To us the most important element is the dependence of the clinical symptoms on the time interval after the insulin injection. We were able to demonstrate that, regardless of the day of injection or the size of the dose (so long as the amount was not above the threshold for the particular patient), after the passing of a fairly definite length of time subsequent to insulin injection, the same symptoms appeared. This was especially true of the onset of the first epileptiform excitement-phenomena, which, in general, for all patients, could first be noted in the course of the second hour. This is so true that with one of our patients on six injection days these phenomena appeared regularly 70-96 minutes after insulin, although the dose varied from 45-85 units, and the blood sugar values from 30-67 mg.%.

8. Finally, it is noteworthy that after interruption of the treatment, part of the intravenous glucose disappears from the blood stream with unusual rapidity. In our observation, in one case ¾ of the amount so administered had disappeared from the blood in six minutes; in another cases 35 minutes after the glucose injection the blood sugar value was only 37 mg.%, but there were none of the so-called hypoglycemic symptoms which were prominent during the treatment, when the blood sugar was 55 mg.% (deep sleep, profuse salivation).

I must from this point onward refrain from giving the results of the other studies in detail. Simultaneously in the same patients records were kept of the differential leukocyte count, sedimentation rate, plasma lability, cholesterin level, calcium-potassium ratio, and also, at frequent intervals of the pulse rate, blood pressure, and temperature. Our only immediate interest in these data is due to the fact that they showed a definite dependence on the time interval after the insulin injection. Again it is in the second hour that the observations were made most interesting. Parallel with the fall in blood sugar to, or to almost, its lowest level is the increase in pulse rate which, aside from its acceleration caused by the state of excitation, rose to the maximum in the second hour and subsequently again decreased. The same holds good for the blood pressure, the amplitude of which usually reached its first peak between the second and the third hours. At any rate, there was regularly a fall in the blood pressure and pulse pressure when the blood sugar level rose even mildly. Moreover, the daily curve showing the relations between the sedimentation rate and the plasma lability show a reversal for the same period, while the leukopenia often observed in the first half hour gives place after a short time to a considerable leukocytosis. These data, briefly summarized, seemed to us already, even without other findings to be adduced, to throw some light on the disputed question of the origin of the clinical manifestations following large doses of insulin.

Up to the present time, among other known changes, alterations in the metabolism, vaso-motor changes resulting from a simultaneous output of adrenalin into the general circulation, formation of substances irritating for the central nervous system—especially substances causing convulsive reactions, disturbance of the humoral balance, osmotic changes, the inability of the cells to oxidize sugar,

sugar deficiency in the ganglion cells, sudden migration of the phosphates into the blood, rapid water exchange, etc., were made responsible for the clinical manifestations. From our findings, in all probability, the following conclusions may be drawn:

After the injection of suitable doses of insulin, on the average, in the course of 1-1½ hours, the blood sugar level diminishes considerably without, as a rule, causing marked clinical manifestations. In the same time interval, there takes place, automatically in accordance with physical laws, a withdrawal of sugar from the blood into the tissues. Without further discussion, these facts agree with Höber's and Löwy's observations, namely, that by means of insulin, as a result of increased permeability, the absorptive power of the cells for sugar is increased. We may, therefore, assume from our data that in the course of the second hour after insulin injection there is a decisive turning point in the pathophysiological conditions.

As a working hypothesis this turning point may be characterized as follows: While up to this point, among other factors, the ganglion cells have been richly supplied so as to maintain their sugar content, or at least have suffered no considerable loss, the milieu surrounding the cells, in ever increasing degree, suffers from sugar deficiency. Consequently, there develops, if I may say so, a potential, which together with the metabolic alkalosis demonstrated by Berendt and Hopmann, also causes an increase in the irritability. In this way we might easily explain how the predisposition to epileptic seizures comes just at the time of the highest potential, or in other words, when the threshold to stimuli is at its lowest.

But once this turning point has been passed, there is a reversal of the pathophysiological processes. There is a compensatory withdrawal of sugar from the cells into the blood stream, which if the dose of insulin was not particularly large, is expressed in an otherwise inexplicable rise in the blood sugar level. Upon the withdrawal of the sugar from the cells of the central nervous system, that clinical phase begins in which we observe the well-known so-called hypoglycemic symptoms. Finally the coma shows us the great sugar deficit in the brain cells. This is seen from the fact that in coma the oxygen can no longer be utilized in the usual way, owing to the lack of sugar, as the researches of Dameshek, Myerson, and Stephenson

have demonstrated. This is evident even in a gross examination of the color of the blood, i. e., if one compares the blood samples taken in deep coma with those taken at other times, the color of the venous blood obtained at the time of coma is outwardly similar to the arterial blood.

We also understand now how in isolated cases an epileptic seizure may follow the interruption of the coma, namely, when the tissues have absorbed the sugar administered while the blood sugar level is still relatively low, when, in other words, the same potential is in force as during the first and second hours after the insulin injection.

If we wish to classify the results of the insulin treatment according to the pathophysiological processes involved we must distinguish three phases:

1. The first phase, from the insulin injection to the so-called turning point, lasts from 60 to 120 minutes and is characterized by a rising potential between cell-and-plasma sugar. At the end of this phase, if at all, the epileptic attack appears. Otherwise no clinical symptoms of a serious nature are seen.

2. The second phase extends from the turning point to the administration of sugar and is characterized by an increasing sugar deficit in the brain cells. The clinical picture is that of sleep or coma.

3. In the third phase the processes are analogous to those in phases 1 and 2, but in the opposite direction. The potential (turning point) observed in phase 1 may reappear, although in general it lasts only a few moments.

This classification, which still leaves untouched the question of the disturbance of the vegetative nervous system, seems to me not only to have a certain theoretical interest but also proves to be essential on the basis of our studies regarding the convulsion therapy.

For, indeed, after we had demonstrated, by our own clinical material, that in some cases the onset of the epileptic attacks at the time of the turning point produced a marked change for the better in the clinical picture, and after we had further determined that individual cases which were resistant to spontaneous seizures under the insulin therapy responded promptly to the ensuing cardiazol injec-

tions we naturally started comparative studies of changes in the body fluids. Moreover, the convulsive therapy quite generally furnishes the opportunity for studying epileptic seizures systematically in a way hitherto unimagined.

First the following studies were undertaken: 17 patients with schizophrenia received a total of 262 cardiazol injections. By this means we produced grand mal attacks 153 times and petit mal attacks 21 times. Then we made a study of the blood sugar, the blood picture, the plasma lability, the sedimentation rate, the bleeding time, the potassium-calcium ratio, the blood pressure, and—except, of course, for the preparoxysmal stage—the cell permeability. For each of these we secured data for the time directly before the injection, the preparoxysmal phase (lasting but a few seconds), the intraparoxysmal phase, and the postparoxysmal phase.

Here, too, because of the shortness of the time, I shall merely outline our most important observations:

1. After the administration of quantities of cardiazol in excess of the ordinary therapeutic dose, there are significant fluctuations in the blood sugar level. Within a few seconds, we see in the preparoxysmal and intraparoxysmal phases variations up to 45 mg.%, which in the preparoxysmal may consist of either a rise or a fall; the change in the intraparoxysmal phase is regularly the reverse of that in the preparoxysmal phase. The postparoxysmal phase regularly shows a rise, and this rise may reach 75 mg.%. When no convulsion took place, similar but quantitatively less significant shifts were noted. With regard to the leukocytes we were unfortunately not able to observe the supposed preparoxysmal leukopenia (for technical reasons), but we did find a leukocytosis beginning even in the intraparoxysmal phase.

2. At the same time there is a shift in the potassium-calcium balance, namely, a preparoxysmal rise in the calcium and a synchronous fall in the potassium. The quotient falls in the intraparoxysmal phase only to rise again in the postparoxysmal one. Here, too, if no convulsion occurs, the alterations are relatively less marked.

3. The blood picture shows a shift to the right in the pre- and intraparoxysmal phases, and a shift to the left in the postparoxysmal phase.

4. While the sedimentation rate in the four successive stages showed a progressive tendency to retardation, the plasma lability presented the opposite tendency, a fact which is to be explained by the shift in the ionic balance. In case there was no convulsion, the plasma lability remained unchanged while the sedimentation rate was slightly accelerated after the corresponding intervals of time.

5. It is worth noting that in the tonic stage little or no more blood could be obtained from the prick in the finger tip, while in the clonic stage the pricked place began to bleed again rather freely.

6. In the overwhelming majority of the cases we met with an increased pulse pressure in the intraparoxysmal phase. This was not true of the resistant cases.

On careful consideration, therefore, we see, surprisingly enough, that the pathophysiological processes which lead to the epileptic attack after large doses of cardiazol coincide fully with those processes which we may observe in the first phase of the insulin treatment up to the turning point. Moreover, our conviction of the parallelism of the pathophysiological phenomena has been strengthened by the results of animal experiments. Mr. de Morsier will report on the histological and pathological findings in these studies. From these experiments it became clear, among other things, that if intravenous sugar was administered, the dose of cardiazol, which had been found sufficient to produce a convulsion in a given animal, was no longer effective and that the seizure was milder after larger doses.

The two therapeutic measures, then have, besides many minor factors, two main points in common, namely: the irritation of the cell membrane and an accompanying increase in the exchange of substances between the cell and its surroundings. We therefore see a powerful factor for recovery not in a "vagotonic blocking" but, on the contrary, in an opening of the floodgates, if I may so express myself, and in the intracellular processes of a manifold nature dependent thereon. This would also agree with earlier observations, though of course on the basis of crude methods, according to which there was especially in patients with schizophrenia of long standing, a strengthening of the barrier between the blood and the spinal fluid. At any rate, this barrier, according to our observations so far, is influenced toward the normal state

by both these therapeutic measures. We are grateful to Dr. Braun of Zürich, whose work on the bromide level supports this view.

Therefore, insofar as it concerns only the phase described here, extending up to the turning point, I may regard the insulin therapy as practically identical with the cardiazol treatment with regard to the pathophysiological processes which are important for the therapy. In the cardiazol treatment, the significant changes with respect to the body fluids are crowded together, while in the insulin therapy the corresponding processes are pictured in "slow motion." Whether still other factors outside of these purely physico-chemical phenomena, as, for instance, the effects of the artificially introduced insulin on the body fluids, are of significance, and, moreover, whether the "slow motion" treatment, to express myself briefly, is advantageous for specific forms of schizophrenia, such as the paranoid in contrast to the stuporous forms, I do not yet dare to decide. At any rate, it is striking that in our experience two catatonic patients, whose illness had lasted about four years and with whom the insulin treatment was unsuccessful, could almost regularly not only be roused from their stuporous state for one or more days but also attained a considerable social remission lasting from hours to days after the epileptic attacks brought on by the subsequent cardiazol injections. Then the curtain fell again as suddenly as it had risen, and every approach to the personality was barred. What factors must be considered responsible for this new locking of the gates, whether it is the deficiency in the hormonal factors, as Meduna asserts and as I believe, it remains for future investigators to determine.

Thus we come to the end of the therapeutic considerations based on our researches. Practically unavoidable conclusions based on observations of a combination therapy tend to prove that we are not dealing with a mere hypothesis. This treatment, which may be called the combination, or even better, the summation therapy, which consists of using cardiazol to bring on epileptic seizures in the second hour after the injection of a coma-producing dose of insulin, seemed to us desirable not only from therapeutic considerations but also for the following practical reasons:

1. Experience has shown us that in those cases in which epileptic seizures seem desirable, the therapy introduced by Meduna meets the great difficulty, namely, that, as the clinical picture shows

improvement, there is an ever greater aversion on the part of the patient towards the cardiazol injections. A majority of the patients showed no amnesia with respect to the preparoxysmal phase. This fact is closely related to a condition of extreme anxiety which may even amount to deathly terror. In our combination therapy this subjective element was eliminated, apparently as a result of the effects of the insulin, even in case they were outwardly slight, and of the amnesia due to the insulin.

2. We had to make the distinction that the cardiazol injections which were not followed by epileptic seizure led to at least a transitory exacerbation of the patient's condition. With the use of the summation treatment the number of recalcitrant cases was lessened in spite of the fact that, with this procedure, smaller doses of cardiazol were used than those required to bring on a seizure if the classical method of Meduna was followed. This statement at the same time substantiates my previous assertions, namely, that in the second hour after the injection of insulin the susceptibility to convulsions is increased. For this reason we generally required only half the dose of cardiazol otherwise needed for a given patient; therefore in our opinion, these doses may be increased without danger so that the number of resistant cases may be reduced to a minimum. Insofar as we may draw conclusions from the animal experiments, it seems possible, by means of the administration of lobelin to deal effectively with the conditions arising from five times the convulsive dose of cardiazol. The following paper by Strauss and myself will report the technical details of the "summation therapy."

9. THE PROBLEM OF CONVULSIONS AND INSULIN THERAPY, II

F. GEORGI AND R. STRAUSS[1]

SPECIAL COMMENT ON THE METHOD DESCRIBED BY MEDUNA

If the insulin treatment on the one hand and the convulsion therapy on the other—two therapeutic methods so heterogeneous in appearance—should prove to have clinical results so similar, it is to be hoped that a comparison of their pathophysiological background will throw light on the basic mechanism of their action.

[1] Waldau-Berne, Jverdon. Director: Prof. Dr. J. Klaesi, Berne.

For this reason we undertook the task of obtaining comparative data by serial investigation in individual cases. So far as insulin is concerned, F. Zimmermann will report the results elsewhere. We shall discuss here only our clinical, humoral, and pathological observations regarding cardiazol convulsions. Later one of us will report on experimental studies with animals, undertaken in collaboration with de Morsier and Rutishauser.

In connection with the insulin treatment we gained the impression early that epileptic attacks occurring in hypoglycemia 1 to 2 hours after their onset, often spontaneously, improved the prognosis, especially in catatonic forms. For this reason we welcomed the convulsion as a supplement to the insulin therapy. As soon as it became possible to produce epileptic attacks almost regularly and at will by therapeutic measures, the foundation was laid for the exact investigation of the pathogenesis of seizures. Heretofore, aside from the hyperventilation experiment, it was pure accident when humoral changes could successfully be elicited in the preparoxysmal phase. The cardiazol injections make it possible to study preparoxysmal, intraparoxysmal, and postparoxysmal changes separately from one another.

I

Before we enter upon our special investigations, there are a few statistical and clinical data to be noted. We must insist that our intention is not to publish statistical results at this time because the cases we have studied are still too few. Instead we wish to make an analysis of single cases which, in connection with the experience we have gathered from insulin treatment, have started us on a new road in therapy.

17 patients with schizophrenia received in all 262 injections of cardiazol; 6 of these patients had 2 to 5 injections; the remaining 11 had an average of 24 injections each. We observed 153 major and 21 minor convulsions. 88 times the cardiazol injection was followed by no convulsion. In 262 injections are included 32 where the cardiazol was given at the turning point. We shall examine later this combination therapy, or to be more exact, this summation therapy.

The statistics show that in 65.6% of the cases without hypoglycemia and in 72% of the cases with hypoglycemia, an epileptic

seizure follows the injection. It should be pointed out beforehand that the doses of cardiazol were definitely smaller with the combination therapy than with only the convulsion therapy. Otherwise we followed the recommendations of Meduna.

A 10% solution of cardiazol Knoll [1] was injected as rapidly as possible, up to 3cc. a second, by a special technique requiring needles of large diameter. In this way the dose of cardiazol could be further reduced. The small number of cases treated by us, as has already been mentioned, does not allow us to present our results statistically. Moreover, we have been treating schizophrenias of varied duration. Nevertheless, the following assertions can be made:

The convulsion therapy was attempted on 5 patients who had been unsuccessfully treated with insulin for at least 3 months, one of them for 6 months. An interval of 1 day to 3 months elapsed between the two methods of treatment. The duration of the illness—frank catatonia—before cardiazol was started was $1\frac{1}{2}$, 2, 3, $3\frac{3}{4}$, and 6 years. With the appearance of convulsions a marked influence on the clinical picture was noted, except in the 6 year old case. Patient M. E., who had shown slight improvement, insufficient for discharge, after 3 months of insulin therapy, responded to the combination therapy with complete remission. The two years' illness of patient J. W., who had been treated in vain with insulin for 6 months and had from time to time passed into coma without preceding marked reactions, showed a marked remission with full insight after 3 cardiazol convulsions. She was discharged on probation and remained in her family circle with no mental aberrations until a relapse occurred which to this day has not been completely relieved. She could not be subjected to further convulsion therapy because of thrombosis in the veins of her arm.

The last two cases, H. R. and M. Z., with illnesses of 3 and $3\frac{3}{4}$ years' duration are remarkable. In them the effects of cardiazol administration, when it was followed by convulsions, were striking. Before the injections both patients were in states of catatonic stupor or catatonic excitement. Immediately after the convulsions

[1] We wish here to express our thanks to the firm of Knoll, Liestal, who supported our work with large grants of cardiazol in dry form and to the firm of Gedeon Richter, Budapest, who placed large amounts of insulin Richter at our disposal.

they were relaxed and in the course of the afternoon attained complete mental clarity. A good affective rapport was established and the entire personality seemed intact. In the early part of the treatment this improvement lasted for several days; later it lasted only for hours. The curtain fell as suddenly as it had risen. They became completely inaccessible.

In this connection we should like to point out that the injection of cardiazol was not without effect on the clinical picture even when no convulsion followed it. As far as we know, it has not been brought out heretofore that patients resistant to cardiazol often show at least a transitory pejoration. This was true not only of the two women just mentioned; it has also been established in connection with many other cases in which cardiazol produced no convulsions.

This fact throws new light on the correspondence, mentioned by Meduna and observed by us too, between convulsive disposition and a tendency to remission.

The question remains whether cardiazol injections which do not lead to the desired goal may produce if not a lasting deterioration at least a hindering of the biological processes necessary to secure a remission. In going over the relatively small material with this in mind, it is striking that the percentage of injections without convulsions in patients tending toward remission was only 14 to 23%, while among the cases treated unsuccessfully the number of cases which did not respond to cardiazol with convulsions amounted to 30 to 50%.

For this reason we have asked ourselves how the tendency to convulsions could be increased without increasing the dose of cardiazol. On the basis of our experience with insulin therapy we held the view that spontaneous convulsions during hypoglycemia were therapeutically desirable. It has long been the established experience that large doses of insulin (great individual variations) are likely to increase the tendency to convulsions in the second hour after the injection; there are, of course, great individual variations.

These considerations led us to introduce a combination therapy, or better, a method of summation, that is, to terminate the hypoglycemia with a cardiazol convulsion. The procedure seemed to

us indicated especially for two reasons, which are easily deduced from the preceding paper of F. Georgi:

1. If our previous assumption was correct, namely, that in hypoglycemia there is a greater tendency to convulsions, then a dose of cardiazol ordinarily insufficient to produce a convulsion would become effective in the presence of hypoglycemia.

2. This combination is moreover to be commended also from humanitarian considerations. In contrast to their attitude towards insulin, we cannot deny that patients often object very strenuously to the injections of cardiazol, especially if they are showing improvement clinically. Some who have had remissions have told us that they were mortally terrified in the few seconds of the preparoxysmal phase, for which obviously there is no amnesia in many cases.

We carried out the combination therapy as follows:

1. We started the insulin treatment, using Sakel's procedure.
2. We began the combination therapy as soon as the dose of insulin leading to coma (Phase II) was determined.
3. From this point treatment was continued along one of the two following lines:

   (a) The insulin treatment proceeded according to the regular schedule 6 times a week. Two or 3 times a week cardiazol was injected intravenously 1 to 2 hours after the insulin injection. In this way we could start with 3cc. of a 10% solution of cardiazol, a dose considerably smaller than the one proposed by Meduna.

   (b) The insulin treatment was begun as in (a), but after the number of units necessary to produce coma was determined, insulin was used only 2 to 3 times a week and on the same days cardiazol was administered in the second hour after the insulin as under (a). Method (b) is to be preferred in those cases which respond with violent seizures.

4. The combination treatment was interrupted within half an hour after the epileptic attack; the method of interruption depended on the patient's physical condition, especially with reference to a tendency to vomit. Freqently patients were able to drink sweetened tea after the epileptic attack. This

fact will be discussed in the following section on the pathology of the body fluids. If the patient failed to wake up sufficiently, the hypoglycemia was ended usually by stomach tube, but if necessary by intravenous glucose.

The use of cardiazol 1 to 2 hours after the effective administration of insulin rests on our observation that most of the seizures obtained solely by Sakel's method occur at this time. This particular time also has the advantage that the patients are generally not yet in coma, but due to the effects of the insulin, they submit to the injection of the cardiazol without resistance being thus spared the psychic insult mentioned above. Of course, the exact time of the cardiazol injection must be chosen in each individual case and according to the earlier or later occurrence of coma. (See "turning point" in the previous paper.)

For the sake of comparison, the results of the original cardiazol and the combination therapy as applied to the same patient are given side by side in Table I, page 82.

From the table we may conclude:

1. In agreement with the data previously recorded in the literature, success is dependent on the duration of the injection.
2. With von Meduna's method it was necessary to inject on the average 6.5cc. of cardiazol to produce a convulsion. The average dose not followed by convulsions was 5.3cc.

   With the summation therapy an average dose of only 3.7cc. of cardiazol was required to produce definite convulsions. Convulsions were absent with doses averaging 3.3cc. Of course, these figures taken absolutely apply only to the given case.
3. The assumption that hypoglycemia increases the tendency to convulsions is confirmed by the figures given above under 2, that is, these figures show that with the combination therapy a smaller dose of cardiazol could be used.
4. Only on the basis of experience with a large number of cases can a decision be made as to whether it is wiser to use the diminished dose of cardiazol or the average dose of about 4.5cc. as it was done in the case cited. With this increase in the dose we could expect a convulsion in most cases. This fact would be important if in the combination therapy too

as well as in the original Meduna's procedure negative results made the patient's condition worse. Heretofore we were unable to answer this question for the summation method.

Although it might seem that our summation therapy makes greater demands on the organism than does the use of either insulin

TABLE I.

Date	Duration of the injection in seconds	Cardiazol alone			Combination therapy				
		Cardiazol 10% per cc. intravenous			Insulin		Cardiazol 10% in cc. intravenous, during hypoglycemia		
		Grand mal	Petit mal	No seizure	No. of international units	Time between insulin and cardiazol injections	Grand mal	Petit mal	No seizure
1936									
1. XII.	30	...	...	4.0	...	...	...	...	...
3. XII.	35	...	...	6.0	...	...	...	...	...
7. XII.	30	7.8	...	...	...	...	...	...	...
10. XII.	30	...	...	7.0	...	...	...	...	...
26. XII.	30	...	...	4.0	...	...	...	...	...
1937									
26. I.	3	...	...	...	80	1 h. 35′	3.0	...	...
29. I.	3	...	...	...	70	1 h. 27′	...	...	3.0
30. I.	4	...	...	...	80	1 h. 39′	3.5	...	...
2. II.	2	...	...	...	75	1 h. 18′	3.5	...	...
5. II.	3	...	...	...	40	1 h. 58′	3.0	...	...
9. II.	3	...	...	3.0	...	...	...	...	...
12. II.	5	...	...	4.0	...	...	...	...	...
16. II.	3	...	...	...	60	2 h. 06′	3.0	...	...
23. II.	2	...	...	...	70	1 h. 42′	...	...	3.0
24. II.	2	...	...	...	70	1 h. 34′	4.0	...	...
5. III.	4	...	...	...	65	1 h. 47′	3.5	...	...
8. III.	4	...	5.0	...	...	...	...	...	...
9. III.	5	6.0	...	...	...	...	...	...	...
11. III.	3	...	6.0	...	...	...	...	...	...
12. III.	5	...	...	6.5	...	...	...	...	...
13. III.	5	...	...	6.5	...	...	...	...	...
15. III.	3	...	...	7.0	...	...	...	...	...
19. III.	2	...	...	...	60	2 h. 32′ (!)	...	...	4.0
23. III.	4	7.0	...	...	...	...	...	...	...
31. III.	2	6.0	...	...	...	...	...	...	...
6. IV.	3	7.0	...	...	...	...	...	...	...
12. IV.	3	7.5	...	...	...	...	...	...	...
15. IV.	2	...	...	...	60	1 h. 23′	5.0	...	...
21. IV.	3	...	...	...	60	1 h. 30′	5.0	...	...

or cardiazol alone, we have so far encountered no adverse reactions during or after the therapy. Moreover, since the summation therapy meets with no objection from the patient, it should be employed in all cases in which Meduna's original method is violently resisted, as well as in those obviously catatonic cases in which Sakel's method alone has proved to be unsuccessful. In

order to satisfy all the requirements of caution, we would recommend that the patients chosen for the summation treatment have an electrocardiogram before the beginning of the therapy.

II

Apart from these purely clinical problems, it has been very interesting, as we said at first, to carry out studies on the body fluids which might afford us some insight into the pathophysiological processes involved in these two therapeutic methods. We hoped at the same time to obtain some exact figures relating to the pathogenesis of the epileptic seizure.

We have therefore made serial investigations in the course of the cardiazol convulsions. We studied the blood sugar especially and also the blood picture, the K/Ca-ratio, the sedimentation rate, the plasmalability, and the bleeding time. Finally, our attention was directed to the blood pressure and the state of the pupils.

The blood sugar: the blood sugar was determined by the Hagedorn-Jensen method. 32 determinations were made on 8 patients. The procedure was as follows: Five samples of blood were taken from each patient at the following times:

1. Fasting, before the cardiazol injection.
2. Immediately after the cardiazol injection. After a little practice we were usually able to get this blood in the 5 to 15 seconds before the convulsion began.
3. Intraparoxysmal, about the end of clonus, shortly before or after the first deep breath.

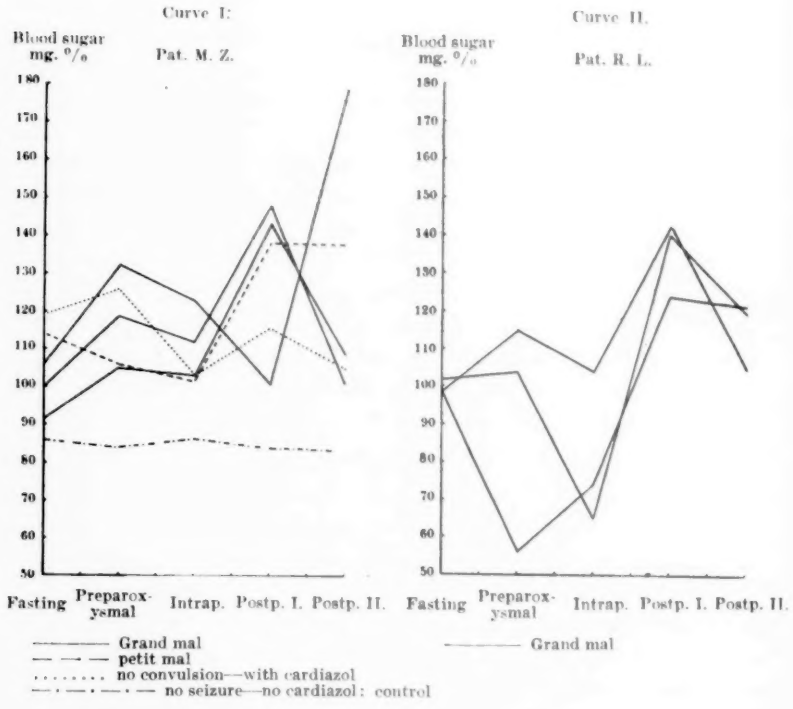
4 and 5. Two postparoxysmal values, the first always 15 minutes, the second 1½ hours after the injection.

Curves I and II may serve as examples of the blood sugar variations observed.

From curve I it appears that the blood sugar remains practically constant before the cardiazol is injected, as we would expect. On the other hand, after the injection we see considerable variations. In the preparoxysmal phase the level rises, except in petit mal attack when it falls. The intraparoxysmal level shows the effect of a compensatory mechanism, except again in petit mal. After the paroxysm there is, without exception, a significant rise which cannot be explained by a discharge of adrenalin accompanying the

muscular activity. For it took place to the same degree after an attack of petit mal and was absent in the first determination made after an episode of grand mal attack. In this case a very high level was reached only after 1½ hours.

We have submitted curve II to show that the individual variations may differ widely and that the blood sugar may fall before



the paroxysm, as we have seen it also in other cases. In one-third of the cases the blood sugar decreased before the paroxysm, in two-thirds it rose. In every case but one the change during the paroxysm was in a direction opposite to the change that preceded it. After the paroxysm there was a constant rise.

The observations on the summation therapy were remarkable. We were struck by the fact that the drowsy patients frequently awoke after the epileptic seizures, whether spontaneous or artificially produced, in spite of their low blood sugar. One patient,

whose blood sugar fell to 24 mg.% immediately before the cardiazol convulsion, but rose in the ensuing intraparoxysmal phase to 43 mg.%, woke up promptly in 15 minutes in spite of a return of the blood sugar to the preparoxysmal level. Another patient who did not show this variation in blood sugar after the attack, failed to awake spontaneously. But before we can speak of any regularity in these phenomena, further systematic investigations must be conducted.

TABLE II.

NO SEIZURE.

Patient Y. G. 10% Cardiazol 3 cc. I. V.

Corresponding Intervals	Fasting	Pre-paroxysmal	Intra-paroxysmal	Post-paroxysmal
Leucocyte count (absolute)	5400	5400	6100	5500
Neutrophile (differential)	73	71.5	67.5	69
Eosinophile "	2	2	1.5	2
Basophile "	—	—	—	0.5
Monocytes "	6.5	6.5	10.5	10
Lymphocytes "	18.5	20	20	19
Plasma cells "	—	—	0.5	—

TABLE II-A.

GRAND MAL.

Patient Y. G. 10% Cardiazol 5 cc. I. V.

Time Interval	Fasting	Pre-paroxysmal	Intra-paroxysmal	Post-paroxysmal
Leucocyte count (absolute)	7500	7700	9400	10 020
Neutrophile (differential)	72.5	—	61	88
Eosinophile "	1	—	0.5	0.5
Basophile "	1	—	1	—
Monocytes "	6	—	7.5	2
Lymphocytes "	19.5	—	29.5	9.5
Plasma cells "	—	—	0.5	—

Blood picture: In 9 patients we studied the changes in the leukocyte count and in the white blood picture at the times mentioned above. The values obtained for a single patient are seen in Table II.

From Tables II and II-A we see that both the white and the differential count are affected, but in different ways according to presence or absence of a convulsion after the cardiazol injection. In the former case we were able to demonstrate a shift to the

right before and during the paroxysm; after it was over there was a shift to the left. In both cases there was a leukocytosis, but in the absence of a convulsion this was transitory and only of moderate degree.

Potassium calcium: 22 calcium and 16 potassium determinations were made. Regardless of the result of the cardizaol injection, the calcium rose and the potassium fell in the preparoxysmal and intraparoxysmal periods.

Plasmalability and Sedimentation rate: Next we endeavored to determine whether the sedimentation rate and its relation to the plasmalability underwent variations independently of the result of the cardiazol injection. By two thorough studies of the same case, one of which involved 10 determinations and the other 12, technical errors could be ruled out. The results were as follows:

As long as the administration of cardiazol resulted in no epileptic attack, it exerted no influence on the plasmalability and the sedimentation rate remained almost constant. But when there was a convulsion, there appeared in the preparoxysmal phase a marked decrease in the sedimentation rate, which at the beginning of the intraparoxysmal phase had fallen to half its initial value (2-5-8 to 1-2-4). The plasmalability showed an inverse variation. Compared with a precipitating 26% salt solution the plasma was increasingly more labile. We are therefore dealing with the so-called ionogenic plasmalability which has been described in the preparoxysmal phase of spontaneous epilepsy as well as in that caused by hyperventilation.

In taking blood so many times for studies just discussed, we naturally paid some attention to the bleeding time. In contrast to the controls it was noted that in the tonic stage little or no blood could be gotten from the prick, while in the clonic stage the blood began to flow freely again.

Apart from these blood studies we studied two phenomena connected with the regulation of the body function by the autonomic nervous system. Our results are as follows:

Blood pressure: 1. An attempt was made to obtain the systolic and diastolic pressure before, during, and after the convulsion. It was technically impossible to secure the preparoxysmal values. Likewise, in the clonic and tonic stages, it is easy to see that no absolutely reliable values could be obtained. We did, however,

compare the readings immediately after the end of the clonic stage: a) while the patient was unconscious (intraparoxysmal) and b) after he awoke (postparoxysmal) with readings made under normal circumstances. 20 cases were studied. 17 of these reacted to the cardiazol injections with convulsions. In 12 cases the intraparoxysmal systolic reading was elevated 10-40mm. of Hg. In 6 cases it was lowered, but never more than 15mm. Whenever a convulsion was produced the postparoxysmal values showed a slow compensatory regulation with a tendency to level out; in the absence of a convulsion there was a more prompt return to the norm. The diastolic values showed no variations in the absence of convulsions. In their presence, however, a tendency toward lower figures was noted. In other words, there was a transitory increase in the pulse pressure.

Pupillary reactions: In the second place we noted a pupillary reaction, the regularity of which requires closer study and theoretical explanation. Meduna's description of the pupils as dilated and fixed to light is not the whole truth. In the tonic and clonic stages the widely dilated and fixed pupils contract after the first inspiration although they still fail to react to light. Moreover, in the interval between the first inspiration and the recovery of normal pupillary reaction, we often saw alternate dilatation and constriction of the pupils under constant illumination (hippus). This phenomenon should be looked for also in spontaneous epilepsy. Negro described an epileptic patient without convulsions who in response to light displayed constriction of the pupils followed quickly by dilatation although the intensity of the light was kept constant. Constriction and dilatation followed each other in rapid succession for a few seconds until the hippus turned into mydriasis with no light reflex. In connection with our findings the observations of Notkin, Coombs and Pike are worth mentioning. "The pupillary reactions were never normal in man during epileptic seizures nor, during the convulsions in cats poisoned with camphor and absinthe. In the tonic and clonic convulsions they were dilated and unresponsive to light. Afterwards they were narrow and often gave the impression of a paradoxical reaction in which the normal response to light was quickly followed by dilatation."

II

In looking back over our findings thus far we come to the following conclusions: The paroxysm provoked by an injection of cardiazol corresponds in its clinical course to the epileptic seizure. Whether the pupillary phenomena which we observed in the cardiazol convulsions constitute regularly a part of spontaneous epilepsy also, is a point that needs further clarification.

Moreover, from the standpoint of humoral pathology it was possible to establish a broad field of identity between artificial and spontaneous seizures. We observed, for example, that ionic changes such as ionogenic lability of the plasma take place in the manner described as characteristic of spontaneous seizures only when the administration of cardiazol results in a convulsion. Besides, our investigations furnish this contribution to the pathogenesis of spontaneous epileptic attacks: they bring closer to a final answer the controversial question as to the most important factor in producing the convulsions. It has become evident that aside from the preparoxysmal shifts in the ionic equilibrium and a simultaneous shift to the right in the blood picture the remaining humoral values show little variation in the absence of convulsions. Still more important is the fact that ineffectual administration of cardiazol causes changes in the blood pressure similar in kind but not in degree to those that follow a seizure. Ionic alterations, however, are absent when no seizure is obtained. These findings support the view that vascular spasm has a secondary importance, while the true pathogenesis of the convulsions is to be sought in the relations of ions to the cell membrane.

In approaching the problem of the relative therapeutic effect of the various factors concerned in the cardiazol therapy we arranged side by side the results of our researches on the pathology of the body fluids and similar data obtained with the insulin treatment. A comparison of our findings with those obtained in our laboratory by F. Zimmermann showed a surprising parallelism pathophysiologically between the changes that occurred in the second hour after the insulin injection and those that accompanied a cardiazol convulsion. The sole difference was the one of time relationship. Processes which in the cardiazol therapy run a stormy course consuming only a few seconds are spread out as if by slow

motion over 2 hours in Sakel's treatment. This relation holds for the sugar changes as well as for others. For it appears that the epileptic tendency is the greatest at the time when the relations between blood and cell sugar are upset. In the insulin therapy this disturbance takes place in the second hour after insulin and in this hour most of the epileptic seizures are observed. It would be out of place here to take up in detail this parallelism. We refer instead to the papers of F. Zimmermann as well as to the preceding report of F. Georgi. In both methods we deal ultimately with physicochemical processes in the cell membrane which are accompanied by pathophysiological changes within the cell. These are the leading factors behind our therapeutic procedure. The summation therapy proposed by us makes use of the foregoing data. Its practical application has confirmed not only our work on the body fluids but also the theoretical inferences we have drawn therefrom.

10. INSULIN AND THE CIRCULATION

W. HADORN [1]

1. *Introduction.* From the broad subject "Insulin and the Heart" or "Insulin and the Circulation" only a few points of practical interest will be considered in this place.

Clinical experience with heart lesions in diabetic patients showing impairment to the circulation, coupled with the fact that every diabetic patient at some time or other is exposed to hypoglycemia (Umber), awakened in the physician the desire to investigate the influence of insulin and hypoglycemia on the normal heart, and especially to find out and combat as far as is possible the effects of large doses of insulin on the sound and on the damaged heart. Therefore the insulin shock treatment of dementia praecox is significant as an experiment on a large scale and offers the physician a welcome opportunity to enrich his knowledge in the respective fields.

2. *What Does Clinical Medicine Know About Circulatory Damages Due to Insulin and Hypoglycemia?* Various authors—I mention Gigon, Strauss, Schönbrunner, Meyer, and Levine from among many—have observed attacks of angina pectoris, apoplexy, coro-

[1] From the medical division of the Tiefenau hospital of the city of Berne. Physician in charge: Dr. W. Hadorn.

nary thrombosis, retinal hemorrhages, electrocardiographic changes, and sudden death in connection with insulin injections. It is therefore advisable to avoid the insulin treatment in diabetic patients with angina pectoris and coronary sclerosis. The source of angina pectoris after insulin injections has been assumed to be a coronary stenosis of vagal origin, for insulin serves as the hormone activating the vagus as adrenalin does the sympathetic nervous system. According to the researches of Hochrein on the animal as a whole and Bärtschi's work on the surviving coronary arteries, no influence of insulin on the diameter of the coronary arteries could be demonstrated. We are rather inclined to believe that the angina pectoris following insulin is due to an excess of adrenalin in the blood. Hochrein thinks that hypoglycemia is the causative agent. Since angina pectoris also appears after insulin with blood sugar values that are normal or above normal, we question this explanation. It is clearly established that there is hyperadrenalinemia after the administration of insulin. Patients with arteriosclerosis, and particularly those with coronary sclerosis are sensitive to adrenalin. That the angina of effort has something to do with the secretion of adrenalin is shown by the appearance of the latter after exertion, in cold weather, with excitement, and after meals. In all these conditions there is an increase in the adrenalin output. One would rather expect adrenalin, as the hormone of the sympathetic system, to dilate the coronary arteries, for the vagus constricts the coronary arteries and the sympathetic dilates them. But so long as the vagus is intact, adrenalin does not dilate them. We explain the angina pectoris arising after insulin and the secondary secretion of adrenalin as due to the rise in the blood pressure, to the increase in pulse volume and the associated increase in the load on the heart, and to the tachycardia, three factors which may give rise to coronary insufficiency when there is coronary sclerosis or coronary stenosis. According to recent investigations adrenalin speeds up the processes of oxidation in the tissues so that in coronary stenosis anoxemia may arise through the outpouring of adrenalin without any increase in the heart rate and without a rise in the blood pressure.

Several authors consider that the heart damage is brought about through hypoglycemia and a disturbance in the heart muscle metabolism as a result of a carbohydrate deficiency, and call the condition "glycoprival myocardium-damage" (Glycoprive Myokardschä-

digungen) (Bürger). Small doses of insulin appear to increase the heart muscle glycogen, but large doses lead to a deficiency in sugar as a result of the reactive hyperadrenalinemia. At this place should be mentioned the beneficial effects of the combined glycogen-insulin therapy on the damaged heart muscle; thanks to insulin, if there is a sufficient intake of sugar, the heart muscle may utilize a greater amount of carbohydrate. Experimental studies of the effect of insulin on men and animals show various disturbances of the circulatory system in confirmation of clinical experience (tachycardia, arrhythmia, electrocardiographic changes.)

The damages to the cardiovascular system were divided into (1) the direct toxic actions of insulin and (2) its effects on metabolism. The latter in turn was subdivided into the two component elements, hypoglycemia and secondary hyperadrenalinemia.

3. *The Author's Own Researches.* In our cardiological studies of insulin shock we found:

(a) In about 50% of the cases there was tachycardia (Sinus tachycardia). If we injected insulin and glucose at the same time, the pulse rate was not increased, that is, the tachycardia was probably due to adrenalinemia.

(b) The blood pressure rose. As a rule the systolic blood pressure showed a slight rise (10-20 mm. Hg) and the diastolic a slight fall (10-20 mm. Hg). This also is typical of the effects of adrenalin. From all appearances, the rise in the blood pressure is due to the thyroid gland, for it does not appear after thyroidectomy (Bérard).

There is a great divergence of opinion in the literature concerning the relationship between the pulse rate and the blood pressure. This is not hard to understand when we consider how differently the individual factors affect one another. Small doses of insulin stimulate the vagus, but large doses are said to cause a primary secretion of adrenalin (Staub). On the other hand, a primary rise in the blood pressure is said to be caused by the stimulation of the central nervous system as a result of the insulin shock (Bürger), and yet Bürger saw a primary fall in the blood pressure after large doses of pure crystalline insulin. There are similar difficulties when we attempt to analyze the pulse rate.

(c) Disturbance in the rhythm was observed in just one case, in the form of ventricular extra systoles.

(d) In almost two-thirds of the cases—we made use of over 100 carefully made electrocardiograms—there were electrocardiographic changes such as one sees with myocardial damage and coronary sclerosis (lowering of the S-T. segment and lowering or inversion of the T-wave.) Recently we were able to observe in insulin hypoglycemia as the only permanent change in the electrocardiogram, that which is characteristic of a myocardial infarct. As a rule the electrocardiographic changes are reversible, that is, they disappear after the termination of the hypoglycemia. Lately we have also been fortunate enough to see cases in which the electrocardiographic changes were not reversible. Our observations, particularly those made in our studies of the simultaneous administration of insulin and glucose, showed us that the electrocardiographic changes are brought about in part by the hypoglycemia and in part directly by the insulin. That they depend on vagus stimulation, as was asserted (stimulating the vagus diminishes the T-wave), is not to be believed, since similar changes appeared in animal experiments when the vagus was cut on both sides and the animal given atropine (Haynal).

The most important question of all is whether the electrocardiographic changes are to be interpreted as denoting myocardial damage. The opinion generally held is that there is no myocardial damage because the changes are reversible. Formerly only the persisting changes of the after-wave were recognized, and if the negative T-wave persisted it was known as the "death wave." In the present state of electrocardiographic knowledge it is not possible to use the reversibility of the changes as proof that there is no myocardial damage. We find changes in the electrocardiogram due to the use of digitalis similar to those found in the insulin shock therapy; most authors were of the opinion that the changes brought about by digitalis did not signify myocardial damage until recent animal experiments were able to produce small areas of necrosis in the heart musculature by means of strophanthin. Therefore the changes due to digitalis are now known to have an anatomical basis. The nature of the digitalis treatment is such that the fewest possible changes appear in the electrocardiogram. We should like to suggest that in the insulin treatment changes in chemical structure are the cause of the electrocardiographic changes, since so

far no anatomical alterations, such as small necrotic areas, have been found in experimental animals (Meyer).

In the above-mentioned case of lasting cardiographic change one might postulate as the etiological basis the gradual impoverishment of the heart muscle with respect to glycogen, and this all the more because in the case concerned the change was chiefly in the **S-T**-segment, and, as we have demonstrated, changes in this segment are dependent chiefly on hypoglycemia. Because of the hyperadrenalinemia which follows the injections of insulin, the organs suffer a sugar deficiency, first the liver, then the musculature, and last the heart. With the restoration of the blood sugar balance, the organs again receive a normal amount of glycogen, first the liver, then the musculature, and finally the heart. Therefore, there is a possibility that in the long-continued treatment by insulin in large doses the heart suffers a gradual impoverishment as regards glycogen.

Even if the practice of the insulin therapy seems up to the present to furnish no evidence of direct effects on the healthy heart, still, on the basis of the electrocardiographic studies, we must reckon with at least a possible, delayed damage to the heart, which does not, indeed, have to show clinical symptoms during the life-time. One should not allow a problematical damage to the heart to destroy the joy in using the new method of treatment; if we were to discredit the insulin shock therapy on this account as dangerous, then we should also have to give up athletic sports and mountain climbing, in both of which there are electrocardiographic changes like the ones seen in the insulin shock therapy. The regular and continual electrocardiographic studies undertaken during the insulin shock therapy are extremely important and instructive and in many cases have a comforting effect on the physician, the patient, and his relatives.

4. *Contraindications to the Insulin Shock Therapy From the Point of View of the Circulation.* (a) *Cases with clinical findings:* People with angina pectoris and coronary sclerosis and those in whom the electrocardiogram show signs of coronary insufficiency without actual angina pectoris should be given insulin only with great caution or not given at all. The same is true of outright hypertension and chronic nephritis, where there is danger not only of retinal hemorrhages but even of apoplexy. One will also avoid the

insulin treatment, save under exceptional circumstances, in cases of valvular heart disease, particularly with aortic insufficiency, in mitral stenosis with a tendency to auricular fibrillation, and in myocardial diseases. With the use of insulin there is an increase in the minute and stroke volume, evidence for which is the fall in the diastolic pressure and the rise in the pulse amplitude, an increase in the circulatory rate (Bertram, Meyer), and also a greater influx into the right heart, which may respond with insufficiency. In case there is myocardial damage even small doses of insulin may cause disturbances in the rhythm, which is always a bad sign, though of course not when the disturbance takes the form of isolated, monotropic ventricular extra systoles. Auricular extra systoles are much more significant because they may pass over into auricular fibrillation. Electrocardiographic examination is absolutely essential to determine the point of origin of the extra systoles.

(b) *Cases without clinical findings but with electrocardiographic changes:* Here we must decide on the merits of the individual case. One may use the insulin shock therapy in case of slight changes, such as a slight disturbance of the intraventricular conduction with diphtheria in the anamnesis, without changes in the after wave, or partial auricular block without the dropping of a systole. Here discussion with the physician is indicated.

5. *Shall Cases With Electrocardiographic Changes Be Treated With Insulin?* (We refer here to changes existing before the treatment, slight and marked changes during the hypoglycemia, and finally non-reversible changes after the hypoglycemia.) Here we are particularly interested in the oral digitalization of the patient. We have already noted that digitalis may cause electrocardiographic changes similar to those due to insulin. Those caused by insulin are increased by the use of digitalis. In all these cases therefore we advise against digitalization. The administration of digitalis to patients with myocardial damage requires the greatest care at any time. There exists, as we know today, a direct relationship between sensitivity to digitalis and to strophanthin and pathological alterations in the heart. Any substance which causes an anatomical change in the heart muscle produces also hypersensitivity to digitalis preparations.

A second reason why we advise against prescribing digitalis is that digitalis given by mouth is effective only when the hyper-

trophied heart is also insufficient. A third reason is that intravenous strophanthin, should it suddenly be required, may be dangerous or even fatal after previous oral digitalization.

6. *Treatment of Circulatory Accidents.* The condition of the circulation in hypoglycemic shock is judged best and most simply from continual blood pressure readings. The effectiveness or ineffectiveness of varied circulatory tonics is also of diagnostic value in contributing to the evaluation of estimating function. Those who pass judgment from the quality of the pulse often fall into errors inherent in the method of palpation.

(a) In the treatment of circulatory disturbances the interruption of the hypoglycemic state by glucose logically occupies an important position.

(b) If signs of acute myocardial failure set in with dyspnea, congestion of the neck veins, enlargement of the liver, gallop rhythm over the precordium, we employ intravenous strophanthin (0.2-0.3 mg., K-strophanthin Bachringer, or 0.25 Ouabain Arnaud with caffeine or deriphyllin injected within 3-5 minutes).

(c) Treatment of circulatory collapse (in collapse the neck veins are empty, in heart failure they are nearly always full and pulsating). In collapse we employ central stimulants, such as caffeine, strychnine, camphor and its substitution product hexetone, cardiazol and coramine, with respiratory disturbance, also lobeline. By preference we use as our first measure an injection of caffeine and coramine, later with the addition of a small amount of morphia. Usually in the treatment of shock, drugs with central action are combined with others whose action is on the peripheral vessels: adrenalin, ephedrine, sympathol. Adrenalin and caffeine bring about also a mobilization of glycogen. Sympathol is an excellent drug to use in collapse. Its action is similar to that of adrenalin but it lacks the undesirable side effects of adrenalin on the heart (extra systoles and ventricular fibrillation). It lacks also the property adrenalin possesses of mobilizing glycogen. After an intravenous injection of 1 c.c. of sympathol the blood pressure rises, the cyanotic skin grows warm and rosy. In veritol (Knoll) we shall soon have at our disposal an excellent remedy for collapse with no side effects on the heart.

The hypophyseal preparations, pitressin and pituitrin, employed to increase the capillary tone, are not recommended because they

exert a harmful effect on the heart. Carbon dioxide inhalation works very well and is a powerful circulatory stimulant. Its danger lies in shock acidosis, the tendency to which is increased by carbon dioxide. For this reason we prefer oxycarbon inhalations (carbogen), which is oxygen with 5% carbon dioxide added. The use of physical agents such as warmth, binders, elevation of the limbs, infusions of glucose in Ringer's solution, and tutofusin is important in collapse. We have had no experience with cortigen as a means of controlling collapse. Its use seems well founded since Pol produced histological changes in the adrenal medulla and cortex by injections of insulin. Although circulatory death in hypoglycemia is regularly cardiac and practically instantaneous, it is expedient in case the heart stops suddenly to try as a last resort—at least as a matter of form—the methods of artificial respiration and artificial circulation with simultaneous intracardiac injection of ½ c.c. of adrenalin.

In conclusion, extensive cardiological research with the insulin shock therapy in schizophrenia has shown that in healthy individuals there is hardly any grave danger so far as the circulatory organs are concerned. At present it is too early to pass judgment on all late circulatory complications. Without doubt the insulin shock therapy is a test of fire for the heart and vessels and should be carried out only with the greatest caution and foresight. Not only for the treatment of diabetes with insulin, but also for the insulin shock therapy, the well-known words of Joslin, the great authority on diabetes in Boston, hold true: "Insulin is a drug for the wise, and not for fools."

11. THE AWAKENING FROM THE HYPOGLYCEMIC SHOCK

CH. PALISA, VIENNA [1]
(IN COLLABORATION WITH A. FLACH)

The study of the phenomena of the awakening from the hypoglycemic shock promises to be of exceptional interest, not only because of the manifestations of cerebral pathology, but also because of psychiatric and psychological considerations. In the patient who has purposely been submerged in a more or less deep coma, we may

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not only observe the recovery from the motor, tonic and autonomic disturbances, but above all we may also note the gradual return from the deepest unconsciousness, through various intermediate phases, to the full restoration of consciousness. In every single patient we live through the reconstruction of the personality day by day, and, moreover, we see in the course of the whole treatment the gradual, or in some patients, rather sudden, advance from the schizophrenic to a normal personality. We may distinctly recognize how—after the shock has caused a temporary utter demolition of all the mental, motor, and autonomic functions—the subsequent interruption of the shock shows that with the return of consciousness there has been a definite breach made in the schizophrenic processes. Sakel has already, even in his earliest reports, called special attention to the periods of mental clarity during the hypoglycemia and after the termination of it. We should like, in addition to his generalized statements, to emphasize the fact that after every arousal from the shock we could note in the patient a definite departure from the schizophrenic autism, an attitude of thought and action directly antagonistic to the disease; we should like to call attention to the increased accessibility and susceptibility to contact, the great spontaneity, and the often impulsive turning toward the outer world, which are expressed not only in the speech-content but also in the movements and conduct. With the awakening from the deep hypoglycemia we frequently see by the smallest details that in Sakel's method an experience is furnished which brings with it an actual transformation of the sick mental functioning.

The following report is based on observations made by Auguste Flach and me on the material in the Vienna Psychiatric Clinic, chiefly in the men's ward, since the introduction of the insulin therapy. A more detailed account of our observations and results together with a group of other studies by A. Flach, J. P. Frostig and myself at the institution in Otwock near Warsaw will soon be published. In today's paper, because of the great variety in the subject and also the shortness of the time, I can report only in generalities and must necessarily shed only scattering rays of light on the details of the case histories.

A systematic, comprehensive, and at the same time experimental study of the reconstruction of the complete consciousness, that is,

exert a harmful effect on the heart. Carbon dioxide inhalation works very well and is a powerful circulatory stimulant. Its danger lies in shock acidosis, the tendency to which is increased by carbon dioxide. For this reason we prefer oxycarbon inhalations (carbogen), which is oxygen with 5% carbon dioxide added. The use of physical agents such as warmth, binders, elevation of the limbs, infusions of glucose in Ringer's solution, and tutofusin is important in collapse. We have had no experience with cortigen as a means of controlling collapse. Its use seems well founded since Pol produced histological changes in the adrenal medulla and cortex by injections of insulin. Although circulatory death in hypoglycemia is regularly cardiac and practically instantaneous, it is expedient in case the heart stops suddenly to try as a last resort—at least as a matter of form—the methods of artificial respiration and artificial circulation with simultaneous intracardiac injection of ½ c.c. of adrenalin.

In conclusion, extensive cardiological research with the insulin shock therapy in schizophrenia has shown that in healthy individuals there is hardly any grave danger so far as the circulatory organs are concerned. At present it is too early to pass judgment on all late circulatory complications. Without doubt the insulin shock therapy is a test of fire for the heart and vessels and should be carried out only with the greatest caution and foresight. Not only for the treatment of diabetes with insulin, but also for the insulin shock therapy, the well-known words of Joslin, the great authority on diabetes in Boston, hold true: "Insulin is a drug for the wise, and not for fools."

11. THE AWAKENING FROM THE HYPOGLYCEMIC SHOCK

CH. PALISA, VIENNA [1]
(IN COLLABORATION WITH A. FLACH)

The study of the phenomena of the awakening from the hypoglycemic shock promises to be of exceptional interest, not only because of the manifestations of cerebral pathology, but also because of psychiatric and psychological considerations. In the patient who has purposely been submerged in a more or less deep coma, we may

[1] From the Psychiatric-Neurological University Clinic in Vienna. Director: Professor Otto Pötzl.

not only observe the recovery from the motor, tonic and autonomic disturbances, but above all we may also note the gradual return from the deepest unconsciousness, through various intermediate phases, to the full restoration of consciousness. In every single patient we live through the reconstruction of the personality day by day, and, moreover, we see in the course of the whole treatment the gradual, or in some patients, rather sudden, advance from the schizophrenic to a normal personality. We may distinctly recognize how—after the shock has caused a temporary utter demolition of all the mental, motor, and autonomic functions—the subsequent interruption of the shock shows that with the return of consciousness there has been a definite breach made in the schizophrenic processes. Sakel has already, even in his earliest reports, called special attention to the periods of mental clarity during the hypoglycemia and after the termination of it. We should like, in addition to his generalized statements, to emphasize the fact that after every arousal from the shock we could note in the patient a definite departure from the schizophrenic autism, an attitude of thought and action directly antagonistic to the disease; we should like to call attention to the increased accessibility and susceptibility to contact, the great spontaneity, and the often impulsive turning toward the outer world, which are expressed not only in the speech-content but also in the movements and conduct. With the awakening from the deep hypoglycemia we frequently see by the smallest details that in Sakel's method an experience is furnished which brings with it an actual transformation of the sick mental functioning.

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A systematic, comprehensive, and at the same time experimental study of the reconstruction of the complete consciousness, that is,

the personality, was never possible before the present time. The Sakel insulin therapy, aside from its therapeutic significance, aside from its share in giving us a more exact knowledge of the physiological phenomena of hypoglycemia in man, has to its credit also the fact that it has made possible the study of the pathological manifestations of the brain during hypoglycemia and the systematic investigation of the reconstruction of consciousness. In every single patient we are able to observe the resolution of the coma and the restitution of the personality day by day. Formerly it was exceptional indeed for such processes to be accessible to observation. I refer to the reports to be cited later in detail about the behavior of hanged persons after resuscitation, the sick after avalanches, about the pictures of the condition which comes on after head injuries, during the progress of uremic coma, after CO-intoxication and other types of poisoning.

As the basis of our investigations we have taken primarily the different phases of the restoration of consciousness and made the following division:

Phase 1. Complete unconsciousness. Here we have only negative findings with no expression of mental life. At this point returning consciousness is indicated only by motor and autonomic symptoms.

Phase 2. Transition Phase. This phase is characterized by speech phenomena such as inarticulate sounds, cries, and formed syllabic fragments. These may be interpreted in one of two ways: a) they are all unconscious expressions, or b) they are already on the threshold of returning consciousness. The catamnestic descriptions of many patients are in favor of the second view for the patients show a memory, however vague, of the beginning of this phase. The material of these memories is frequently quite amorphous; often it is bound up with the last moment of consciousness, or it refers fragmentarily, to be sure, to incidents in their environment. We see many patients spontaneously sit up and react to stimuli of every kind, although these reactions are still inadequate and non-specific and show no real awareness.

Phase 3. The Phase of Awareness. Exteroceptive stimuli are perceived but not yet apperceived. If we take speech again as the chief expression as well as indicator of the higher functions of consciousness, then we see in this phase the use of fragments of past experience, of impressions from the outer world which were

indeed perceived but did not quite come into full consciousness, and which are now developed and expressed in the echolalia, the perseveration of the patient. As a parallel to this, in the field of gestures we see echomimia and echopraxia. In this phase also comes the stage of understanding gestures which, in analogy to ontogenetic development, precedes the understanding of speech. Moreover we observe incipient, though often unco-ordinated, movements, away from painful stimuli, movements which then pass over in a stereotyped fashion, into the automatic repetitious motions similar to perseveration in the field of speech.

Phase 4. State of Susceptibility to Contact. In this stage questions put to the patient are not only perceived but also apperceived. At the same time the answer may be beside the point—psychotic,—speech may not be completely restored and we may get aphasic reactions of the most varying kind such as disturbances in articulation and phonation. While in the preceding phases there was a sort of general, non-specific awareness of the outside world, we have here in the fourth phase a definite, adequate awareness. We see completely developed contact. There is a very good comprehension of gestures.

Phase 5. Phase of Orientation. In this phase consciousness is completely restored. Questions are more perfectly apperceived in their setting and answered relevantly as far as the cross-section of the psychosis allows. With this phase are introduced the "constants of the day," a concept presented by Frostig, meaning behavior of the patient characteristic of a given day. By it we understand a sort of characteristic behavior pattern of the patient, with its form changing but in a definite direction, outside the time of hypoglycemia, that is, from the time of the complete recovery of consciousness to the next shock treatment.

Along with the recovery of consciousness, in our study of the arousal-reactions, the restoration of motor responses was noteworthy. On the basis of thorough-going observations we may say that the motor reactions of the awakening can by no means be described as a simple return of the same motor and tonic responses that preceded the shock, nor do they show at all the same picture as during the motor phase preceding the coma. Of course there are cases in which there actually is a sort of mirror-image repetition of the motor phenomena following the interruption of the

deep coma, but along with these we see great individual variations in the appearance of the motor manifestations. Thus on the one hand we were able to observe patients who had a violent convulsion during the shock and who were only gradually roused from the deep coma by means of the stomach tube without showing any motor restlessness, and also the very opposite—calm shock with motor restlessness on awakening. I must, however, emphasize again that here I am speaking only about patients roused from deep coma. With the administration of sugar during the state of motor excitation, or right at the end of it, we find analogous motor phenomena flashing out again in the recovery from the hypoglycemia. Because of lack of time I must refrain from a discussion of the phenomena of motor recovery during the awakening and should like merely to mention that if the shock dose, the shock depth, the shock duration, and the method of interruption remain constant, there is surely a specific motor reaction for each separate individual. Every patient has, so to speak, "his" shock and "his" arousal, in which the particular type and sequence of symptoms is kept and reproduced each time with photographic accuracy. The controlling influence may be the constellations of the cerebral pathology of the individual—if I may use the expression—but also there may be in the realm of physiology, individual differences with respect to the ability and rate of absorption and utilization of sugar. If we come back to these constellations of individually different cerebral pathology, we must refer to a lecture recently delivered by Angyal in Vienna. Angyal, in contrast to what we have set forth today, puts the center of gravity of his observations on the localization in the cerebral cortex. He distinguishes two main types of shock: a frontal and a parietal, each of which branches out into further syndromes. Thus he finds as characteristic of the frontal pole type moriatic excitation, euphoria, and psychomotor unrest before the beginning of the shock. With respect to moriatic excitation which becomes evident also on awakening, we may affirm that it is to be taken as a frontal reaction type. With respect to euphoria, we may regard it as a universal phenomenon associated with awakening and not as a specifically frontal symptom. We observed this euphoria in the majority of the patients, even those who presented on waking outspoken parieto-occipital syndromes

and thus might give this post-hypoglycemic euphoria a more universal applicability. We shall return to this subject later.

In the frontal type we see not only during shock but also on awakening an emergence of primitive movements about the mouth, such as chewing, smacking, sucking, and swallowing, as well as the grasp reflex. On the motor side there is a marked tendency to crossing, in many cases even the picture of outspoken frontal apraxia in standing and walking. Motor aphasia appeared repeatedly. Starting with the picture of total motor aphasia, the process of recovery carries us over a stage of ungrammatical phraseology with literal paraphasia accompanied by marked contortions of all the facial muscles. The patients themselves state that the words are present in their minds although the pronounciation of them has become impossible. A student with medical training spoke expressly of motor aphasia. A second patient reported "I don't know . . . . I wanted to talk but always swallowed . . . . the letters . . . . the words . . . . I couldn't get them out . . . . I had them, though . . . . talking turned into swallowing."

Angyal distinguishes further four subdivisions of the parietal type. His syndromes comprise anosognosia, sensory and amnesic aphasia, derangements in writing, drawing and figuring, in sense of station, perception of movement, conception of space and of the passage of time, agnosias, dysmorphias, etc. Our patients too showed these phenomena on awakening. But we could not apply such sharp distinctions within the parietal reaction-type. Instead we saw overlapping and merging of Angyal's parietal groups.

Autonomic derangements and their termination when the patient wakes may be omitted here since a special lecture is devoted to them at this congress. We wish only to say a word about the behavior of the body temperature because it concerns a point we shall have to deal with later. It is well known that in deep shock we find hypothermia with temperatures as low as 30.5° C. When glucose is given by stomach tube, there ensues a very gradual rise in temperature. Along with this rise many patients show a tremor of their whole musculature. They warm themselves as animals do after hibernation. Even in the period of complete contact the normal temperature may not be restored for a long time. We shall return later to the psychotic production of heat present in many

patients. In severe shock we see late fluctuations in the form of the appearance of fever the same afternoon or evening. It often sets in with nausea. We might refer this phenomenon to excessive injury to the corresponding centers in the midbrain. This view is strengthened by the presence of a certain unsteadiness especially in the temperature center which can readily overshoot its mark. In a case of prolonged severe shock we saw not only on the same day but also on the afternoon of the next day a sudden rise in temperature for which no explanation could be given. It is altogether possible that we may speak in this connection of a lasting dysfunction of the temperature center, especially since the behavior of the pulse and blood pressure point in this direction.

We should like now to speak of a few particulars which are found in the majority of shocks. When we think of the whole personality of the patient after he awakes, we are struck by his euphoria, extroversion, and hyperprosexia. There awakes before our eyes, as it were, another man. We see someone we have not known before. It is a veritable escape from the withdrawal and seclusion typical of these patients, indeed it often amounts to a flouting of every convention. The patients observe all that goes on around them, they ask questions and seek information, they take their places in their environment, they begin conversations, they expect the doctors and attendants to come to their beds and talk matters over. We see a precursor of these reactions even before accessibility is fully attained. Before the recovery of their normal power of speech, the patients take up words spoken nearby, and repeat them often in the same tone as the first speaker used. Furthermore they show their adaptation by using as their first vehicle of expression a foreign language they may happen to hear even at some distance. Afterwards as their consciousness returns and they can be properly contacted, they use this same language to answer questions put to them in German. In describing their experience they often emphasize that the repetition and imitation of words they have heard is their first means of establishing contact with their environment. Moreover, in the frank and open manner with which they address the investigator, a definite escape from the schizophrenic withdrawal is manifest. This mood of extroversion passes over into the "day-constant" and, as treatment continues, lasts longer until finally it becomes permanent.

In one group there appears at the time of the awakening, parallel to the ability to make contact, an elementary, impulsive release, which may be expressed in many ways. We see in a number of the patients a sort of frank eroticism, which however does not extend to gross sexuality, but is rather the expression of a need for affection and is in direct contrast to the schizophrenic seclusiveness. With other patients there develops at about the same time an aggressive attitude toward the environment which also has a phasic character and, like the erotic behavior, comes suddenly and disappears just as suddenly. Both the erotic and the aggressive behavior may be explained as instinctive, or, on the other hand, the erotic release is also comprehensible psychologically as the expression of a readiness for contact, a breakdown of the autistic basic mood, but with a sort of dysmetria on the affective side, a kind of over compensation, preceding it.

Almost universally we see more or less stereotyped infantile features in the awakening, without being able to consider them as characteristic for any definite type of awakening. Generally we find them joined with the euphoric mood. The bearing of these patients is childishly simple in mimicry and behavior; in addition there are expressions of helplessness, calls for mother, requests for help, etc. The patients behave unconventionally, address the people about them familiarly, and speak of themselves in the third person. At the same time in phonation and modulation their speech is babyish, affected, drawling, spaced, scanning, overaccentuated, often ungrammatical. To a question about the date they frequently name their birthday and add, "That is my birthday." Even in giving their age at this time they leave us no doubt that a regression exists; thus a patient said he was six years old, went to school, etc. Later to a question about the matter, he declared that he had not been joking but since his speech had become childish he felt like a child. Another patient begins a requested writing test in the cursive script and later continues in the Latin script. Asked why he had written the cursive at first he says: "Because that is the way I first learned it." In all these reactions one thing is to be noted: at this time the patient is by no means any longer out of his mind and beclouded. These infantile reaction-types correspond to the behavior of his primitive personality—it is, so to speak, a regression to an ontogenetically earlier stage, a regression which we

might consider in terms of brain pathology to have been called forth by a temporary suppression of the highest levels of mental functioning. Besides these infantile part-reactions already discussed above, which we were always finding here and there, we frequently observed infantile total-reactions which are looked upon as the basis of a systematic structure of the contact with the environment. Here we must draw the analogy to the release reaction in stupors: just as the phase of excitation with them so here the infantile conduct makes at the beginning only a transitory break in the autistic-repulsion behavior pattern; in analogy to the condition of motor relaxation in stuporous patients we have here a state of affective let-down, which is ever increasingly prolonged so that by way of the infantile conduct a transition is found to a lasting grasp on contact, which finally leads to social adjustment. As a case of stupor observed by Flach and Kauders shows, this way has a therapeutic value of its own, even without the insulin treatment. With the patient in question the mother-child relation was the only one upon which he was approachable and finally by a fictitious childhood situation, success was actually achieved in leading him out of his stupor and bringing him to social adjustment by the way of transference.

For one group of patients also there is characteristically the appearance of psychotic behavior of greater or less duration. We must distinguish two kinds of these psychoses, neither of which is closely connected with the transitory psychotic character of the daily constants.

1. A reactivated psychosis is one which occurs only in a patient who has been lucid and oriented for more than a day and appears in him not only during the shock but also during waking hours; it is like his original psychopathic behavior or at least has a number of features identical with it.

2. The psychotic variant of short duration is not like the original psychotic picture and is also different from the delusions still present for more than a day, but it bears a definite schizophrenic stamp. Often we see here a psychotic interpretation of stimuli from the outside world or of organic sensations. Thus after stomach tube feeding a patient reported that just before waking he had dreamed that his mother came to him, kissed him, fell on his neck . . . . "and breathed into me, thus, on my mouth, and

through that it came to my throat . . . . so that I drew in my breath and was hypnotized through my trachea," etc. Since these delusions of the patient are entirely different from his original ones and appeared only after this stomach tube feeding, we may surely assume that this feeding was the stimulus that served as the causative agent. Shivering, also frequently observed after the interruption of the hypoglycemia as a sign of the "warming up," is in such cases interpreted as "being electrified." Here we must emphasize that such ideas of influence were not demonstrable in the original psychosis.

In the framework of the gradual building up of consciousness we naturally see phases of treatment when the patient is still slightly bemused, forgetful, shows difficulties of grasp so that questions must be repeated many times before they break through, but we see no actual twilight state except after late epileptic attacks or protracted shocks.

It is to be noted that the method used for awakening the patients after late epileptic attacks is somewhat different. Here we use osmon [1] alone or osmon + food by stomach tube, seldom the stomach tube alone. When the stomach tube alone is used the awakening is of an entirely different character. The patients are dazed, feel exhausted, are in the twilight state, have a great desire to sleep, and are utterly lacking in the feeling of relief ordinarily following the shock and the euphoric mood, reminding one so much of the behavior of epileptic sufferers. It always takes hours after such an occurrence before the patients are again refreshed and more or less adjusted; generally the euphoria does not appear until the next day. In one such case, whose late epileptic seizure was interrupted solely by the stomach tube, there developed a typical epileptic twilight state with aggressiveness, motor restlessness, a fixed stare, and monotonous drawling speech broken with inarticulate cries. It seems conceivable that the usual intravenous osmon counteracts the development of such an outright twilight state after late epileptic attacks.

Frequently we see an incipient deepening of the shock directly after the interruption of the hypoglycemia. This condition lasts for a very short time. It is a question whether in this event we may

[1] Osmon = 33% Sterile sugar solution for i. v. injection.

speak of a result of a sensitivity developing from overdosage. But sensitivity is quite likely a causal element in the appearance of so-called protracted shocks. We present the following abstract from the record of such a case of protracted shock:

Patient S. 3½ hours after the injection of 65 units of insulin the patient began to enter coma, which was interrupted 1¼ hours later by stomach tube. Since he did not awaken after half an hour but rather continued in deep coma, with shallow, rapid respiration and outright hypotonia, he then received intravenous osmon + betaxin. Shortly thereafter there were myoclonic twitchings in all the limbs and the head and then a transition to opisthotonus. At the same time the eyes were in extreme Bell's position, and respiration was deepened by fits and starts, with spastic components. The whole body was held like a rigid system upon passive turning. The patient then received more osmon, novalgin, cardiac stimulation, and finally lumbar puncture. Now a rolling movement began of which at first the most marked result was a turning towards the left and later frequently rolling to the other side, when one got the impression that this rolling toward the right was released by a passive tug at the body. Almost regularly such a rolling to the right was followed immediately by a typical roll to the left. The rolling movements usually extended to about 180°. Then there was a short period of exhaustion followed by a reverse roll of 180°. Very seldom did the patient roll through the whole 360°. A deviation of the eyeball toward the left regularly preceded the rolling movements. During the rolling movements and immediately at their close there were inarticulate cries and howls. Between rolls, with gradually decreasing frequency, there was a short period of rigidity which reminds one of the decerebrate rigidity. Toward the end of these phases it looked as if unco-ordinated kicking and pushing movements would appear which would, by their appearance, always bring to an outbreak the ever-renewed impulse to turn. The kicking increased and the rolling decreased, and then there appeared the embrace reflex which could be produced in the way characteristic of the Moro reflex, by touching the palm of the hand. Connected with the appearance of this primitive reflex were the mouth movements, sucking movements, and the grasp reflex. An Amylene enema finally succeeded in quieting this restlessness.

A more exact examination of the tonus and reflexes had to be omitted because any touch brought on a new convulsive reaction.

After the awakening the patient was dazed, did not speak at first, then gradually became catatonic.

Frequently such a condition is introduced by one or several epileptic attacks.

After hearing this record you will readily recognize the close analogy to the condition of patients after strangulation, cranial injuries, CO-poisoning, etc. Because of the shortness of the time I shall merely refer to these analogies and only discuss them in detail in the forthcoming publication already mentioned.

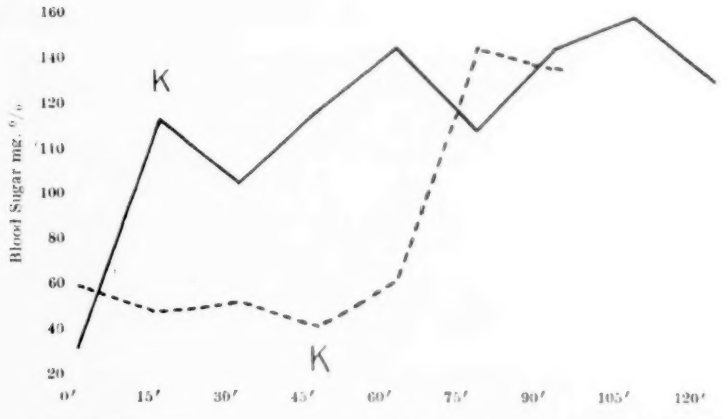
We must still mention a few other atypical kinds of arousal, first of all the spontaneous levelling-off. We often see that although the unconsciousness due to the shock has already begun, it may suddenly be suspended again by means of a vehement convulsion and the patient may become fully capable of speech and contact. In case such a phase of motor excitation occurs in a stuporous patient,—since a psychic release usually accompanies it—it is used for the termination of the hypoglycemia for therapeutic reasons; because then, as a matter of experience, we could observe an extension of the heightened liveliness and activity into the daily constants. To provoke this motor excitation subcutaneous adrenalin has recently been injected during this phase with good results. Finally, we may say in conclusion that the awakening from hypoglycemia is dependent on: a) the duration of the shock, b) the depth of the shock, c) the dose required to produce the shock, and d) the method of terminating the shock.

The dependence on the duration of the treatment is not often seen in pure culture since a sensitivity acquired in the course of the treatment demands a progressive decrease in the dose, in the majority of the cases.

The type of arousal is characteristic of the method of termination of the shock. With the stomach tube we see a gradual restoration in which the phases of consciousness described above are only slightly overaccentuated by the convulsions.

After osmon-administration in suitable doses, we generally find a sudden awakening. After the use of adrenalin in the deep coma without the administration of sugar, it may happen that the patient does not waken at all and must be fed, or there is a slowly drawn

out picture of the phenomena of the shock reappearing in the reverse order. Now there is no gradual reconstruction but a disordered awakening. One might most properly speak of a simultaneous awakening of strata of phylogenetically different periods. While the patient is capable of speech and contact, we still find stereotyped movements, rhythmic movements of the legs forward and back, marching, rubbing, etc. At the same time there are pyramidal signs, accentuation of the reflexes, frequent aphasic reactions, etc. The following curve illustrates the relative state of



Blood Sugar Values on Awakening. Patient N.

the blood sugar after stomach tube feeding and after the administration of adrenalin.

We hope that we have given you in broad lines a sketch of the manifold character of the awakening from the hypoglycemic shock. Much that is interesting had to be omitted, as well as special descriptions by the patients themselves of their experiences in the shock and in the awakening, the reconstruction of the world of perception, etc. A. Flach and I have devoted our new publication to these last questions. Moreover, because of the shortness of the time, amnesias and their value as elements in the healing process could not be discussed. For a complete, detailed presentation of the whole subject I refer you to the aforementioned work of Flach, Frostig and me, which will shortly be published.

12. DISTURBANCES OF THE AUTONOMIC NERVOUS SYSTEM IN SCHIZOPHRENIA AND THEIR RELATIONS TO THE INSULIN, CARDIAZOL AND SLEEP TREATMENTS

HANS OSCAR PFISTER, HERISAU [1]

We become most conscious of the gaps in our knowledge of the somatic bases of schizophrenia whenever we are obliged to pass theoretical judgment on a new method of therapy. In the hope of making some progress in the last 1½ years I have conducted a series of physiological researches on 290 persons; among them there were 104 healthy, 32 psychopathic and 184 schizophrenic individuals. Professor H. W. Maier kindly placed at my disposal some of the schizophrenic patients. I am reporting to you today the results of my studies since they seem to me to offer more definite points of attack on problems regarding insulin therapy, its indication, its course, and the evaluation of its results.

I shall submit to you in graphic form the autonomic reaction types which have presented themselves to me as being characteristic of varied schizophrenic pictures. As you know, the autonomic nervous system falls into two divisions, the sympathetic, the functions of which we call ergotropic, following W. R. Hess, and the parasympathetic, the action of which we refer to as trophotropic. In my experimental studies I employed definite stimuli to disturb the equilibrium between the sympathetic and the parasympathetic control in different organ-systems. From the increase or decrease in excitation of the two antagonistic partners a reasonably true picture was obtained of the sensitivity and functional capacity of the autonomic apparatus. I was often able to study numerous cases many times in the course of different phases of the disease.

First, the circulatory system: At any moment the heart's function seems to orient us with regard to the autonomic forces at work in its field. I took the pulse rate of my patients for 3 minutes lying down, then 3 minutes standing, and again 3 minutes lying down. The force that disturbs the autonomic equilibrium in this experiment is the shifting of masses of blood within the body. To

[1] From the Institution for Treatment and Nursing at Appenzel on the Rhine, Herisau (Director: Dr. Hinrichsen) and the University Psychiatric Clinic Burghölzli, Zürich (Director: Prof. H. W. Maier).

avoid a fall in the blood pressure on standing up the sympathetic goes into action in the normal individual and produces acceleration of the pulse. Soon this is suppressed by the parasympathetic but later it wins the upper hand again. This interplay is continued until a new equilibrium is established. When the patient assumes a horizontal position, analogous changes in the autonomic excitation are manifested. The pulse was counted for intervals of 15 seconds and the results charted. The most conclusive of these ortho-clino-static pulse curves is to be seen in Fig. 1.

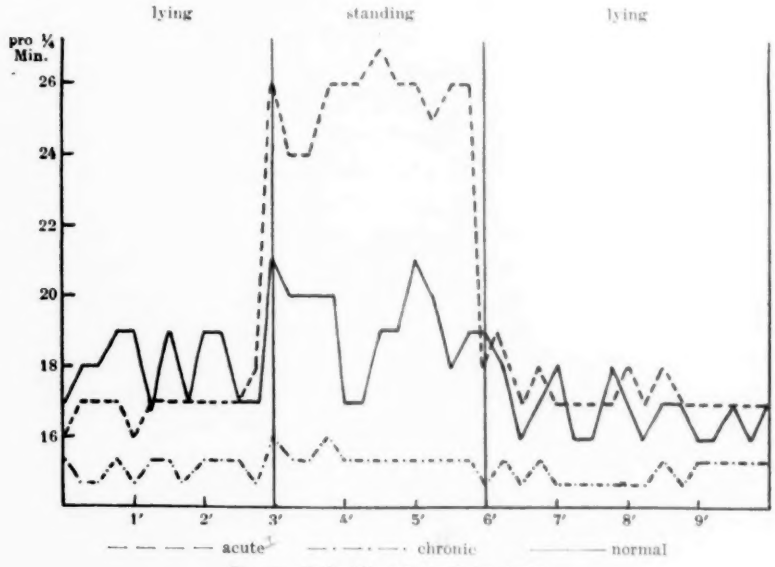


FIG. 1. Ortho-klino-static Pulse Curve.

Let us consider first acute schizophrenia. I include in this group the cases of shortest duration showing psychomotor excitation or tension, and usually dissociation. The majority of them had been ill less than 6 months. Occasionally acute episodes occurring later in the course of the disease had to be included. I shall refer to these cases as Group I. The behavior of the pulse in the primary stages is characterized by enormous acceleration on standing up and sudden slowing on lying down. The undulations in the pulse curve that tend to level out in normal individuals are nearly always missing.

Let us compare with this picture the one seen in chronic schizophrenia. The patients are physically deteriorated, autistically absorbed in themselves and demented; they are catatonic and paranoid schizophrenics. The duration of the illness exceeds for the most part 1½ years. I refer to them as Group III. In these patients oscillations in the pulse curve are no longer found. Change of position from horizontal to vertical can no longer cause ergotropic acceleration of the pulse. Both forces that control the blood pressure have suspended their balancing functions.

Next Group II. It includes clinically the well-preserved hebephrenic and paranoid forms which have behind them the stormy primary stage or have developed without this stage. The duration of the illness may be from a few weeks to many years. Passage over into Group III is always a possibility. The pulse curves exhibit a manifold picture. The chief differences from the normal are a late rise, a slowed fall, a failure to even off, or unexpected peaks. Occasionally they seem like the normal curve or resemble one of the other two groups. On the whole, however, they fluctuate between the two extremes, thus corresponding to the clinical condition of the patient.

A comparison of the results of this first series of experiments shows: Group I is in a state of morbid hyperexcitability; Group II, in a state of deficient restitution or partial damage, while Group III shows a complete loss of the autonomic regulation of the pulse.

For the blood pressure too, I made an ortho-clino-static examination and obtained the same results as with the pulse. (Fig. 2). Insufficiency of the regulation increases here also as the disease progresses. In normal individuals the blood pressure remains practically constant when the patient lies down. In schizophrenia, on the other hand, it falls with standing, about 5 to 30 mm. of Hg. Group I shows still a slight effort at regulation. The minimum blood pressure readings rise again while the patient is standing.

The body temperature was the subject of a further study (Fig. 3). The patient was given a hot foot-bath at 40°C. for 15 minutes followed by a cold foot-bath at 20°C. for 15 minutes. The axillary temperature was taken every 7 minutes. In the normal group the hot bath caused a rise of 0.4 to 0.6°C. in body temperature, the cold bath a fall of the same extent. The acute cases that make up Group I show a tendency to rises in temperature even without

experimental influence. This tendency was little altered by the conditions of the test. There was at times a slight rise during the cold foot-bath. This feature too, represents a hyperexcitability of the regulatory mechanisms. Even in normal individuals cooling stirs up the oxidative processes. In Group I they were excited to such a degree that no fall in temperature took place with the cold foot-bath. The chronic cases of schizophrenia in Group III reacted differently. They frequently displayed subnormal temperatures. The hot foot-bath provoked no rise in temperature or only a sluggish one, more often a fall. Group II also showed sig-

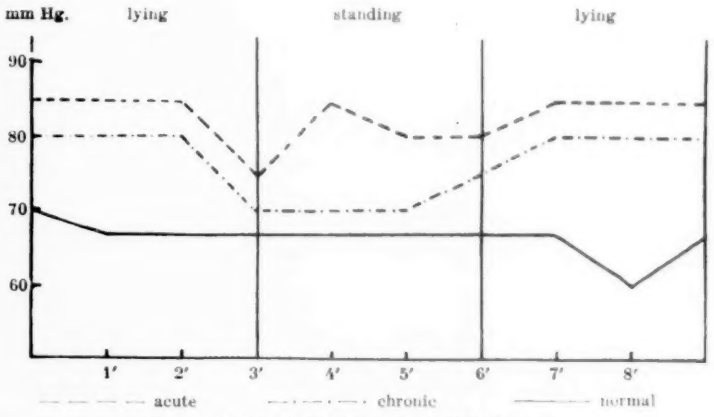


FIG. 2. Ortho-klino-static minimal blood pressure.

nificant departures from the norm. In this group we found especially paradoxical reactions, less frequently curves resembling those of Groups I and III. We noticed also disturbances in the body temperature, which we must consider as primary hyperexcitability and secondary impairment of function.

A further experiment is concerned with the circulation in the skin which is under autonomic control (Fig. 4). As an external stimulant I used a mustard plaster which I cut into 8 small pieces. I applied one piece every 3 minutes. 24 minutes after the beginning of the experiment the plasters were removed and their effect noted. The healthy subject showed gradually increasing irritation of the skin in varying degrees, patchy, mild, and marked erythema. Seldom was there formation of papules or spreading of the capillary

dilatation outside the area of irritation. In Group I a spreading beyond these limits set in after 6 to 12 minutes. In Group III on the other hand there was usually mild erythema only after half an hour. Group II displayed all the possible reactions from excessive to sluggish irritability. Although the evaluation of these findings is subjective, it is certainly true that the reaction of the skin vessels indicates increasing functional debility in the autonomic regulation.

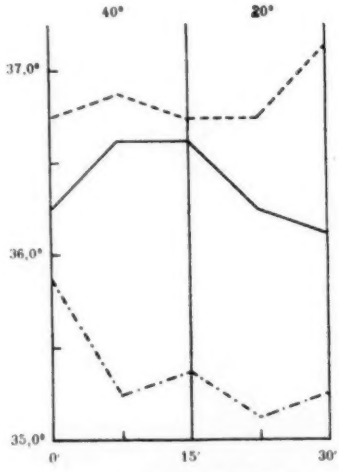
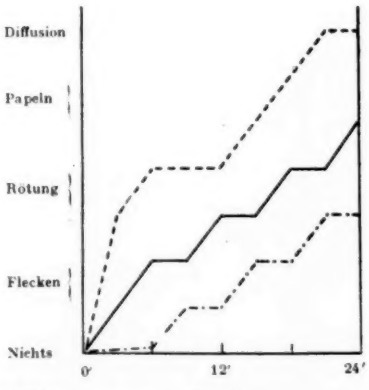


FIG. 3. Thermal curve



— — — — acute; — · — · — · chronic; ———— normal

FIG. 4. Skin reaction to mustard plaster

For a study of the water balance I made use of the Volhard test. The patients were given 1½ liters of tea at 7 a. m. and no more fluid for 24 hours. The urinary output was measured every 30 minutes and its specific gravity determined (fig. 5). Naturally only those patients were tested whose water intake before the test was sufficient. In normal individuals the urinary output per half hour rose during the first two hours to 400-500cc. and in the third hour fell to 10-30cc. The rise in the output in Group I comprising the acute cases did not occur till the third hour. It was poor, amounting to less than 200cc. and falling immediately thereafter to minimal values. This reaction represents an ergotropic hyperexcitability of the autonomic system. The ergotropically excited organism loses so much fluid by increased oxidation and perspira-

tion that it must restrict every other form of fluid output. In the chronic tertiary stage the urinary output rises only slightly, but the fall lasts a long time, more than 10 hours. This is a very sluggish reaction, representing the inability of the body to protect itself against excessive fluid as well as against dehydration. Group II also showed disturbances and varied between the normal and insufficient regulation. These results too, corresponded with the behavior of the pulse.

The blood sugar can be influenced in 3 distinct ways: by carbohydrate intake, and by the administration of either insulin, or

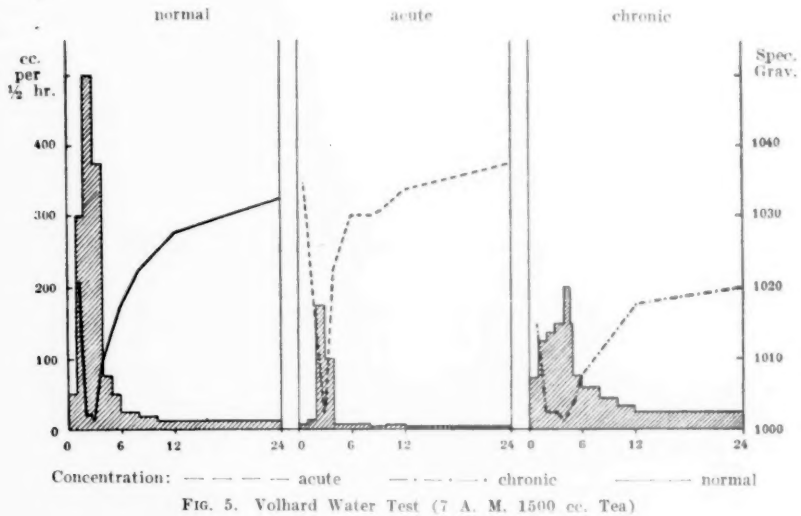


FIG. 5. Volhard Water Test (7 A. M. 1500 cc. Tea)

adrenalin. For the experiment on carbohydrate intake the method of Roggenbau was used. We gave the fasting patients 100 grams of levulose by mouth and determined the blood sugar every 30 minutes afterwards (fig. 6). In the normal individuals there was a steep but brief rise after the levulose was given, then a gradual fall. In schizophrenic patients the result was different. The acute cases showed a rapid rise exceeding by many times the normal value and a relatively slow fall. The ergotropically excited schizophrenic organism retained in the blood ready for use great quantities of sugar over a long period. With chronic schizophrenia on the other hand, the blood sugar rose very slowly, often failing to

reach its maximum in 2 hours. This is evidently a result of the delayed absorption of sugar, and another expression of a weakness in the autonomic function. We know that the absorption of food stuffs through the intestines is an active function under autonomic control and not merely a passive diffusion through permeable membranes.

I injected the adrenalin in the fasting state according to the method of Dresel, subcutaneously, in doses of 1 mg. and made blood sugar determinations at half-hour intervals (Fig. 7). The resulting

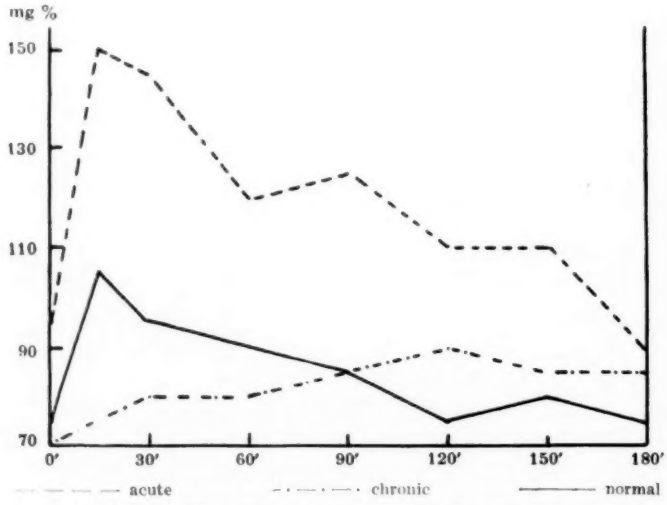


Fig. 6. Blood Sugar After 100 g. Levulose Orally.

hyperglycemia in normal persons reaches its maximum of 120 to 150 mg.% after 30 to 60 minutes. This rise in the blood sugar is attributed to the stimulation of the sympathetic nerve-endings. When their capacity to respond is increased, as it is in acute schizophrenia, we observe much more marked rises. The group of chronic cases, on the other hand, showed only a minimal rise because they had lost the normal reactivity of the sympathetic nervous system.

To test the effect of insulin on the blood sugar we used the method of Isaac and Stamm. We gave 1/15 unit per Kg. of body weight and made blood sugar determinations every half-hour (Fig. 8). Normal subjects showed in the first half-hour a fall of 20 to

30% below the fasting level. After the second half-hour the original level was regained, owing to the secretion of adrenalin within the body. If the response is slow and delayed there is a lowered reactivity of the sympathico-adrenal system. This is what we find with nearly all schizophrenic patients. The fall is excessive, the rise is feeble and delayed, especially in chronic cases. In this group the results agreed with our anticipations; with the acute cases it is illuminating that their hyperexcited autonomic system responds with a weak and poorly sustained reaction. With all schizophrenic patients the discharge of adrenalin within the body

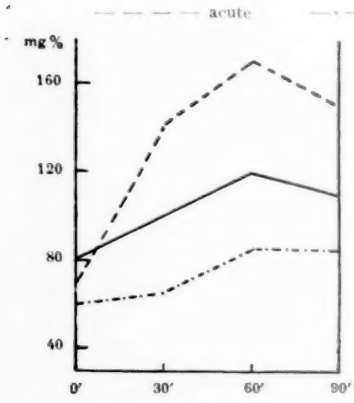


FIG. 7. Blood Sugar After 1 mg. Adrenalin.

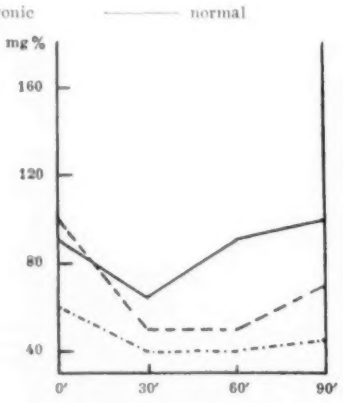


FIG. 8. Blood Sugar After 4 International Units of Insulin.

is so slight that they cannot make adequate compensation for insulin hypoglycemia. This inability in the acute cases may be due in part to hyperexcitability of the parasympathetic. All three blood sugar experiments, therefore, add further evidence of a functional incapacity of the autonomic regulating system, which increases progressively with the duration of the illness.

I have now mentioned all my experiments that are completed at present. Unfortunately, lack of time prevents me from going into discussion of the literature as well as of numerous theoretical problems. These aspects will be dealt with in detail in later reports. My purpose was to examine the dynamics of the entire autonomic system by a uniform method. The conclusion derived from this study is that in schizophrenia the very refined regulating mechanism

shows first a weakening and finally a complete loss of function. The derangement of the sympathetic is much more striking than that of the parasympathetic, which works more quietly and has less to do with the organism as a whole. From the vegetative as well as from the psychiatric point of view, we may distinguish in the course of schizophrenia 3 stages; the first and third are sharply defined. The first stage includes the acute cases with tense or excited motor phenomena, vivid trains of thought, hallucinations, and stimulation of the affect. At the other extreme are the chronic catatonic and paranoid cases with impoverishment of movement, loss of interest and will, and affective inaccessibility. Between the two lie the less demented hebephrenic and paranoid forms. This correspondence between my autonomic findings and the clinical pictures makes applicable to the pathology of schizophrenia the statement of W. R. Hess, the Zürich physiologist, that the cerebral cortex is like every other organ, subjected to the regulating influence of the autonomic nervous system. We come then to the following hypothetic concept of schizophrenia, a concept which is naturally far more comprehensive and requires further proof and with which Professor Hess, in a personal interview, has expressed his agreement:

Schizophrenia is a disease of the autonomic nervous system which involves the entire organism including the cerebral cortex. In the first stage of the disease, as well as in later acute episodes, there is hyperexcitability of the regulating mechanisms. Later the system becomes functionally less competent and at last fails altogether. The mental manifestations of schizophrenia are, we believe, symptoms, expressing themselves mentally, of course, in a disease which is primary in the autonomic nervous system. This idea might account for the disappointing results obtained in the past with psychatric methods.

An autonomic disease, naturally, should respond to autonomic drugs. Here our path joins that of the modern therapist. The treatments by suggestion, by fever, by sleep, all of them affect the vegetative processes. But they do so only partially and therein lies their weakness. Cardiazol whips up the autonomic system to epileptiform attacks, and for this reason can restore to fertility the fallow field of vegetative function. The question is, for how long. And now insulin. Its physiological action is to damp the sympathetic. Therefore it should be able to protect the autonomic

system from excessive excitation of its sympathetic part and the consequent exhaustion and failure. Thus it is theoretically the best drug so far tried. Perhaps further studies will show us still other ways not merely of damping the autonomic mechanism but actually of restoring its regulating activity to normal.

13. PRELIMINARY REPORT ON OBSERVATIONS OF AUTONOMIC FUNCTIONS IN THE INSULIN SHOCK TREATMENT OF SCHIZOPHRENIC PATIENTS

HANS WESPI[1]

I call my present report "preliminary" because the studies which form the basis of its content are still in full swing in our clinic and laboratory and do not yet suffice for a complete explanation of the fundamental problems. Researches similar to ours in some respects have already been published by Heilbronn[2] of Münsingen and v. Pap of Debrecen.[3] From their papers emerged a fact already familiar in part to internal medicine, that hypoglycemia brings about very striking phenomena in the realm of the autonomic nervous system, which produce effects of significance for the insulin therapy, of great importance to science, and of vital interest to the patients themselves. As research progresses in the field of autonomic phenomena, it becomes more and more evident that the autonomic nervous system holds a dominant position by the side of the central nervous system in the events of life. It holds joint sway with the endocrine system, which is often subordinated to it, over those vital processes that are controlled by polar orientation. (L. R. Müller[4]) (W. R. Hess[5]). I remind you only of the change of tone in the parasympathetic system preceding sleep. (W. R. Hess[6].)

Since the autumn of 1936 we have carried out in our clinic continuous detailed studies on our insulin patients. Our aim was to

[1] University Psychiatric Clinic, Burghölzli, Zürich. Director: Prof. H. W. Maier.

[2] J. Heilbronn, Münsingen, Schw. Med. Wsch., 40 (1936).

[3] v. Pap, Wschr. Psych. Neurol., vol. 94, part 6 (1936).

[4] L. R. Müller. Lebensnerven und Lebenstriebe, Springer, Berlin (1931).

[5] W. R. Hess. Zürich, Regulationsmechanismen von Kreislauf und Atmung, Thieme, Leipzig, 1933 and 1934.

[6] W. R. Hess. Der Schlaf. klin. Wschr. No. 4, 1933.

inform ourselves more fully about the autonomic changes not only in isolated hypoglycemic seizures but also during the entire period of treatment. In a brief paper it is naturally impossible to report all the results. I shall therefore confine myself to the portrayal of certain functional alterations and to a brief review of the conclusions drawn from our investigations as far as they have gone.

We learned first to distinguish rapid functions involving instantaneous reactions such as the pupillary reflexes from functions with sluggish reactions like certain metabolic phenomena. The state of the pupils permits an immediate inspection of the condition of the patient's autonomic nervous system. On the other hand, certain pathological components of the urine, though doubtless attributable to the hypoglycemia, make their appearance much later. For instance, when the insulin shock is induced in the morning, they may be found for the first time in the evening urine. Hence it is not surprising that an investigation of autonomic function by the more rapid method presents all the individual phases in a composite picture whereas a study of the metabolic processes yields only their algebraic sum.

The fluctuations in the width of the pupils in hypoglycemia are very impressive. We took measurements every 15 minutes in a very dark room. After long experimentation we made readings accurate to $\frac{1}{2}$ mm. and recorded them on a simple chart. In this manner we secured relative values accurate enough for purposes of comparison. Our work is based on 110 curves obtained by the study of 23 patients. It became apparent in a short time that a constant change of tone in favor of the parasympathetic as was at first believed or in favor of the sympathetic as Heilbronn concluded was quite out of the question. We did show that the pupils very often became progressively narrower as consciousness diminished. But in almost as many cases the reverse was true: the pupils became steadily wider and often attained great maximal widths. From these data we would have been obliged to infer that on one occasion the organism became parasympathicotonic, on another sympathicotonic. But we have curves recorded which cannot be assigned to either category. They represent cases showing enormous fluctuations in the width of the pupils during the glycopenic process. Our measurements range from 2-9.5 mm. (See Figs. 1-3).

This third type of pupillary behavior regularly accompanies psychic excitation. It represents the so-called "reactive psychosis" of Sakel. The period of pupillary dilatation coincides with that of the excitement and corresponds in most cases to an excessive anxiety. Large pupils are a well-known symptom of anxiety. This corresponds to a sympathicotonic shift of mood in the

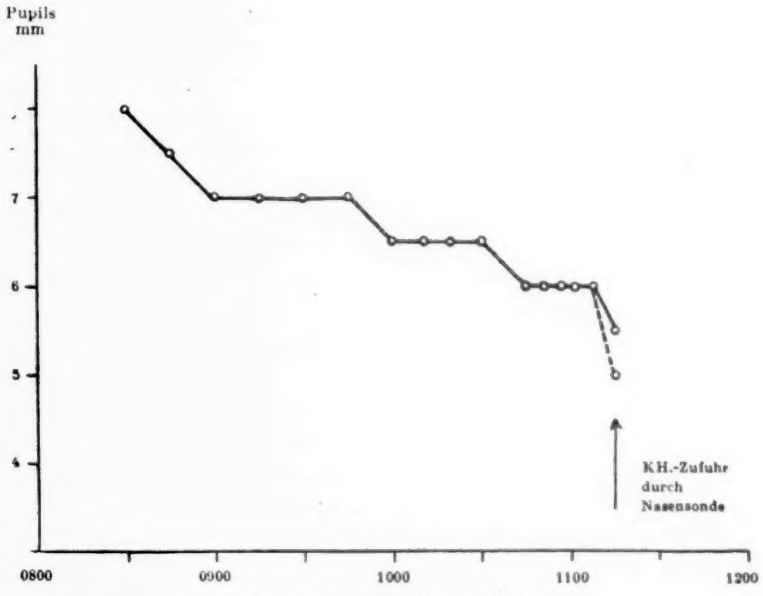


FIG. 1. Parasympathicotonic type.

Behavior of the pupils in insulin shock—140 units of insulin. Pat. M., J., male 18. 2. 37.

——— right.
– – – – – left.

organism—to that condition referred to by W. R. Hess as "ergotropic," in which all the powers of the organism are pressed into the service of the animal as a whole. It is this sympathetic tuning which raises the individual to the highest pitch of activity. In our patients treated with insulin we often observed that the enormous mydriasis was followed by a miosis just as marked and these successive oscillations between the two extremes wore away in the course of minutes. With one of the patients (Fig. 5, J. J.) we were able to observe that regularly as his pupils dilated, he cried out, sat erect, and made energetic defense movements, while in the period of narrowed pupils he lay quietly in deep sleep.

We were able to make an exceptionally interesting observation on a catatonic youth. (Fig. 4, B. A.) He showed pin-point pupils (2 mm.) together with twitchings and other epileptiform symptoms, which were followed by dilatation of the pupils to 9.5 mm. He was brought out of coma by intravenous glucose. Once awake he suffered an anxiety attack with vivid hallucinations. He

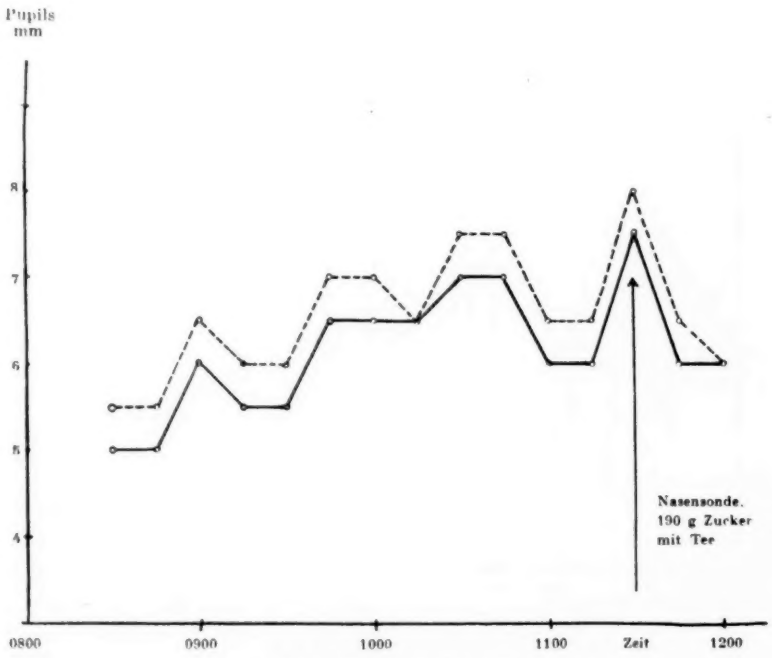


FIG. 2. Sympathicotonic type.
Behavior of the pupils in insulin shock—80 units of insulin. Pat. B., K., male. 21. 12. 36.
——— right.
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screamed, raged, struck about him, and gave vent to the following psychotic content which is reproduced here to give an idea of the processes which go on in such periods of predominant sympathetic tone. The patient screamed the following words, approximately (shorthand report): "Thou Father in heaven and Mother on earth, Mother Earth. Say it! Oi, oi, oi, Father in heaven and Mother on earth, and over the Water! Surely I will help the Father, but I must help the Mother too. . . . . But I must see the heavens

and the earth. I must see them and also the water: Dear Saviour, Dear Saviour, I will surely say it in all languages . . . . but I must mount upon the water. . . . . Nevermore can I go home. O dear Father! . . . . (Seizes a bystander by the arm and holds him with a vise-like grip) Dear Father! That never again must I see the water. Thou Father knowest it. I do not want anyone to cut

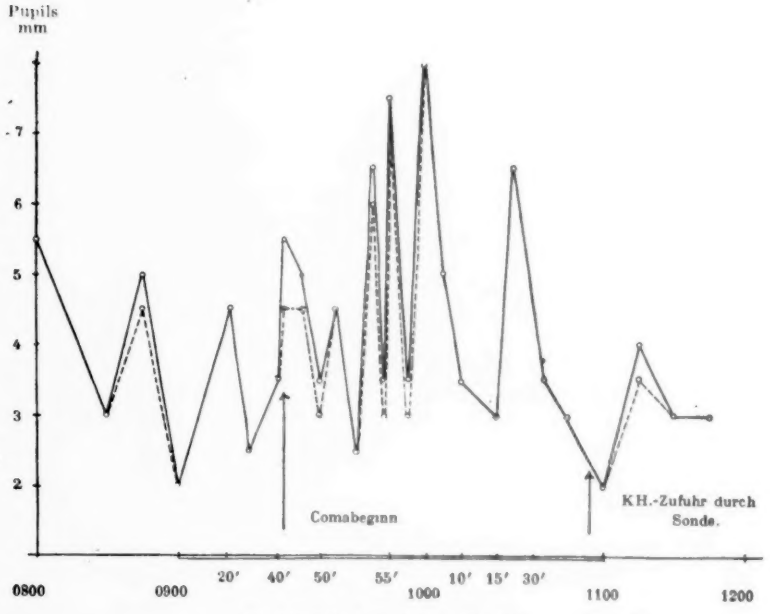


FIG. 3. Extreme vegetative oscillations.

Behavior of the pupils in insulin shock—55 units of insulin. Pat. J., P., female. 24. 2. 37.

——— right.
– – – – – left.

the scab off him. Imprisoned forever, and never free again! And over the Saviour the blood! Life, life! But knowest thou what the Mother of God says? . . . . Never again shall I say it. The Mother of God is not guilty, nor Mary! I know too what joy is, and I also know what meat is, and the Father in heaven knows it too! But the Father does not know what air is" . . . . etc.

Now we shall not and cannot decide here whether the autonomic excitation is the cause of the acute schizophrenic state of excite-

ment or vice versa, the excitation of the affect expresses itself in the autonomic state. We will affirm only that an acute change in mood of this sort usually runs parallel with autonomic excitation.

Our work with pupillary changes may allow us to infer that neither a parasympathicotonic nor a sympathicotonic state of the organism can be provoked by the insulin treatment. On the con-

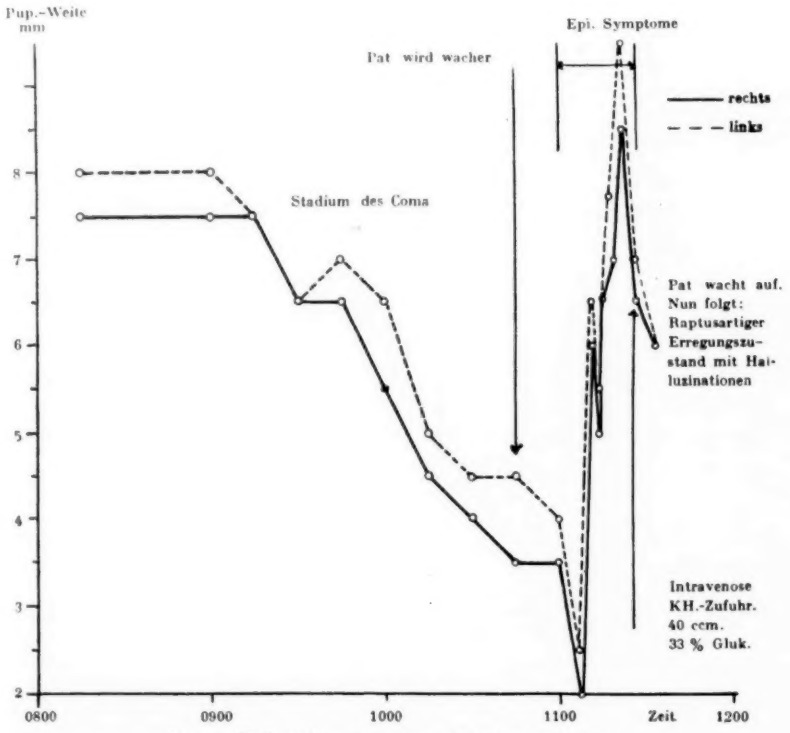


FIG. 4. Epileptiform Symptoms, following excitation.
Behavior of the pupils in insulin shock—60 units of insulin. Pat. B., A., male. 22, 12, 36.

trary, in one and the same individual, and under apparently identical external conditions, the pupils may show one day sympathetic dilatation, and the next day parasympathetic constriction. We have even found cases where at the very moment when the insulin began to show its effects one pupil was constricted, the other dilated. In the stage of coma there are frequently marked degrees of anisocoria; we obtained differences as great as 2 mm. between the right and left pupils.

Studies of the secretion of sweat and saliva yielded results similar to those obtained from the pupils. The prominence of these findings in hypoglycemia was previously known from internal medicine. We were interested to a greater degree in the character of the secretion. Since the investigations of Erlanger's school [3] it has been known that thin saliva and sweat are elaborated under the influence of the parasympathetic while the viscous secretions, on the

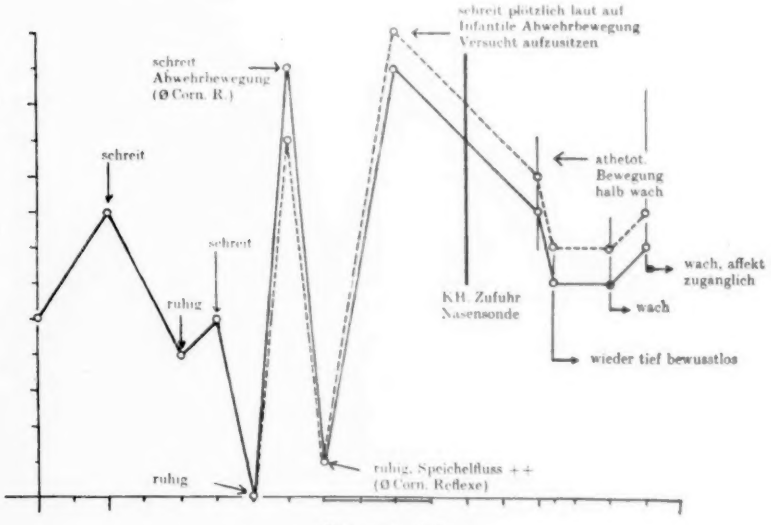


FIG. 5. Coma with hallucinations.

Behavior of the pupils in insulin shock—54 units of insulin. Pat. J., J., male. 20. 1. 37.

——— right.
– – – – – left.

other hand, are to be ascribed to sympathetic stimulation. We attempted to determine the quality of these fluids by simple cover slip tests. We noted that the alterations in their properties are striking and easily determined. Serial investigations showed clearly that here too it was impossible to speak of any changes of a vegetative nature. The secretion of sweat, after the capillary changes, is the first vegetative phenomenon to appear in hypoglycemia. It takes place in separate spurts so that an examination of changes in the quality of the perspired fluid is possible. Here more obviously than in the case of the pupils marked fluctuations in the autonomic status must exist so that at one time a viscous secretion predomi-

nates, at another time a thin one. From our series of investigations I shall select one at random to illustrate what I have said:

Illustration: Patient M. E., Male, age 24.

15th Shock (8/5/37) 120 Units of insulin injected at 8:00 o'clock.

Time	Clinical observations
9:25	Slight erythema of the face.
9:30	Slight perspiration, viscous.
10:30	Somnolence.
10:40	Comatose, profuse perspiration, thin.
11:05	Profuse perspiration, viscous.
11:15	Perspiration +, thin, and saliva ++, thin, gastric juice: slight, mucous, HCl +.

Thus the secretion may change in manner and degree, or the course of events may be very different. It is impossible to formulate a rule. We can say with assurance only that very marked alterations in tone must take place between the two antagonistic components of the autonomic system, the sympathetic and the parasympathetic. In the opinion of W. R. Hess a relation of this sort is characteristic of a system which has lost its equilibrium. When there is primary increase in tone, for instance, in the sympathetic system, the tone of the antagonistic parasympathetic must likewise be increased so that no condition may befall that imperils life. The therapeutic use of insulin amounts to a powerful assault on the autonomic balance and leads to the fluctuations we have described. Our studies, however, do not permit us to say with assurance that this primary assault is equivalent to a rise in parasympathetic tone. Indeed, we have observed the opposite, when the primary impulse was in the direction of an increase in tone in the sympathetic. The autonomic response to insulin may vary from day to day in one and the same patient. In different patients there is naturally great diversity.

The study of other autonomic functions showed a similar inconstancy. With regard to the heart rate, bradycardia is by no means obligatory. We have seen patients, on the contrary, who responded quite regularly to the hypoglycemic stimulus with an increased pulse rate, although there were no noteworthy circulatory signs. The only response we have met with regularly is a fall in temperature. Observations of the blood pressure confirmed our

earlier ideas. In the hypoglycemic stage there may be either a fall or a rise in the blood pressure, although a fall is more frequent. Still, these fluctuations are very difficult to evaluate because of the motor unrest of the patient.

We failed in the attempt to fit into a harmonious picture the numerous vegetative functions, many of which were observed at the same time. We cannot then speak of a universal shift in tone in favor of either component of the autonomic system. A certain

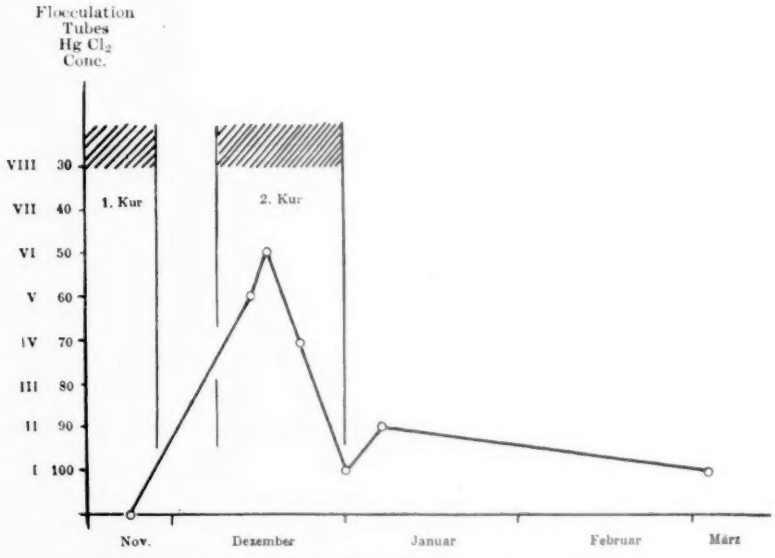


FIG. 6. Takata-ara reaction in the course of insulin treatment. Pat. B., K., male. Average 80 units of insulin.

dissociation appears to prevail in the autonomic regulation of the various organs affected. We must, however, carry these studies further before we can speak of final results. The question must still be asked whether the schizophrenic organism necessarily in all cases reacts like the healthy one. It seems conceivable that in the light of more exact studies certain of its bodily functions will be found unlike the normal.

In our studies of metabolic functions we noted deviations from the normal. Starting with the idea that the action of insulin stands in very close relation to liver function, we employed the Mancke-

Sommer modification of the Takata-Ara reaction to study the albumin-globulin ratio in the blood serum before, during, and after the insulin stage. The principle of the reaction is based on the precipitation of protein by a metal. The more coarsely dispersed particles are removed more readily than the finer ones. From the precipitate a conclusion can be drawn concerning the composition of the serum protein which is probably largely dependent on liver

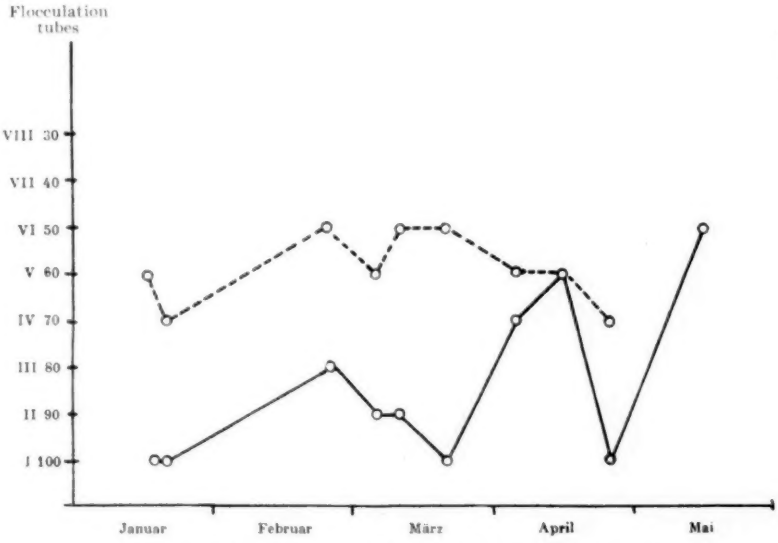


FIG. 7. Takata-ara reaction in the course of insulin treatment.
Pat. F., L., female.
——— Flocculation.
– – – – – Clouding.

function. The alterations we found were considerable. (See Figs. 6-8.)

The complex relations of the protein structure in its more intimate connection are still far from clear. Besides the change extending over the entire course of the insulin treatment, which, as the curves show, unquestionably exists and appears with some regularity, there is another series of changes during each 24-hour period following the administration of insulin. A few hours after the shock reactions are over, the Takata-Ara reaction may be positive, while in the mornings before and after the shock no change

is to be found. We must, however, further settle the question whether these protein ratios are not altered in the schizophrenic organism in contrast to normal conditions as our records showed to be true in the case of several patients.

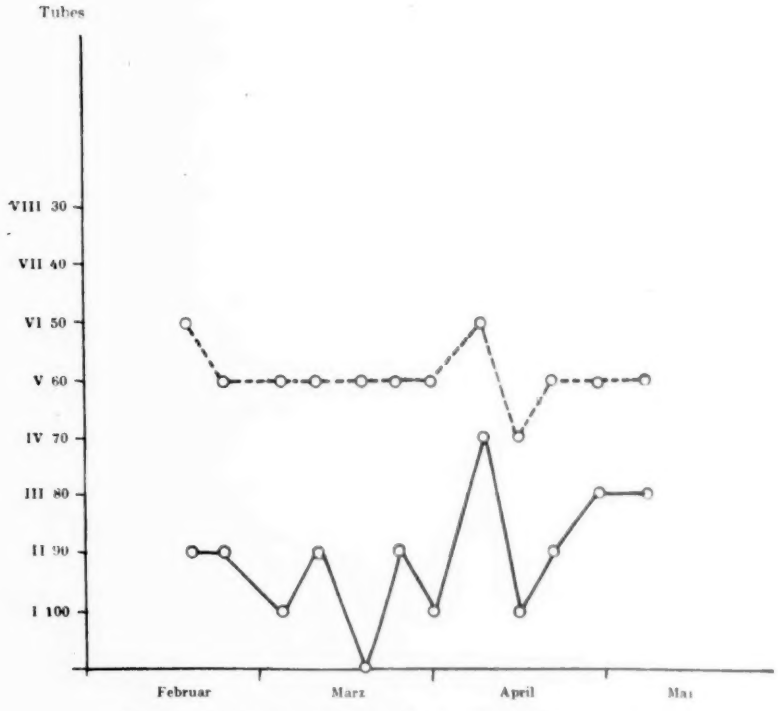


FIG. 8. Takata-ara reaction in the course of insulin treatment.
Pat. St., M., female.
——— Flocculation.
– – – – Clouding.

This very pervasive influence on metabolism finds its expression also in excretion. For periods of months we examined the urine of our insulin patients twice daily. We were able to show that periodic alterations took place in all of them. Pathological findings were far more frequent in the evening specimen. The commonest abnormality was the appearance of urobilinogen in large amounts; next to that was the appearance of urobilin. We refer here also to the altered liver function.

Moreover, we observed frequently that after a period of urobilin excretion small quantities of protein partly in the form of granular casts and coma-casts (komazylindern) proper were excreted, often along with sugar. The synchronous excretion of foreign substances is almost certainly to be attributed to a disturbance in the permeability of the kidney filter. Moreover, we have noted in a few cases acetone bodies in the urine which bear testimony to marked disturbance in the metabolic processes. Most commonly diacetic acid was present, acetone was found more seldom. This is evidence that the oxidative disintegration of sugar goes on in patho-

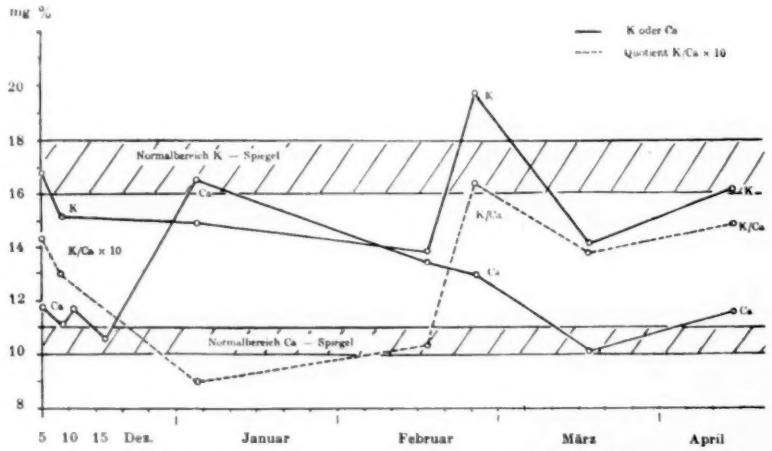


FIG. 9. Changes in the K- and Ca-ion level during insulin treatment (blood serum). Average dose—210 units of insulin. Pat. H., W. male.

logical ways, which are familiar in extreme emaciation or diabetes. These substances were to be found mostly when the coma was made too deep or a menacing condition had supervened for other reasons (e. g., epileptiform convulsions).

We endeavored to answer the question whether a universal autonomic alteration played a rôle during insulin therapy by careful investigation of the calcium and potassium ion levels. It is known that a rise in the postassium level exerts an action similar to that of the parasympathetic, while a rise in the calcium ion level imitates sympathetic stimulation. As Fig. 9 shows, there are unquestionably great alterations in these ionic levels. Nevertheless we could find nothing more definite than enormous deviation from the normal.

Finally I should like to refer briefly to certain capillary symptoms. The capillaries too show a multifarious set of variations in their functional condition during insulin shock. We have not yet carried our microscopical studies on insulin patients far enough to indicate the possibility of a definite conclusion. Certainly in the majority of cases there appears under the microscope capillary dilatation and an increase in the number of functioning capillaries.

We have had among our patients some who reacted in the opposite way to the injection of insulin, and showed complete ischemia of the skin. The case of a young catatonic was very impressive. (Patient B. A., Age 18). He developed a peculiar reversal of capillary reaction which was for a time sharply localized. At first he became markedly flushed during coma, a reaction involving dilatation of the skin vessels. At the same time there occurred a slight improvement in his psychic state. After the 24th shock there was a sudden change. All the cutaneous capillaries were contracted and he grew deathly pale during the insulin shock. Thereafter he suffered regularly epileptiform convulsions and showed no further psychic improvement, but instead seemed definitely worse, so that at last the treatment had to be discontinued.

The complexity of these vascular changes is further illustrated by a patient who reacted almost constantly with a fever-like flush on the left side of the face, and on the right side with an outspoken pallor. This phenomenon could be terminated in a very short time by intravenous glucose.

In conclusion, it seems that also the capillary function in insulin shock supports the concept of a definite dissociation in the mode of reaction rather than of *a priori* definable one-sided change. (Predominance of one or the other component of the autonomic system.)

14. EXPERIMENTAL HISTOPATHOLOGICAL RESEARCHES ON INSULIN SHOCK

F. ACCORNERO,[1] ROME

The growing favor which the insulin shock therapy is winning in psychiatry has stimulated us not only to test the method clinically but also to carry on experimental histopathological researches. We

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shall make a brief report of our work at this time while we wait for a compilation of it *in extenso*.

Our histopathological experiments were performed on dogs. We divided them into two groups. Group I comprises dogs subjected to an insulin shock daily for a period of 1-11 days. The dogs were then allowed to die under the influence of insulin. Group II comprises dogs in which insulin shock was induced daily (with one day of rest after every 6 days) for a period long enough to obtain 30 shocks for each dog. The animals in this group were not allowed to die under the influence of insulin, but were sacrificed at intervals of 2-15 days after the last shock.

In the dogs of the first group we met with diffuse alterations in all the nerve cells of the brain. In a large number of them the alterations were of the acute type (acute Nissl cell disease) and reversible. In about half as many, other grave alterations of cells of various degrees culminating in "grave cell-disease" were observed. They showed diminution in size, hyperchromatic nuclei, formation of perinuclear clear zones, vacuoles in the cytoplasm, fragmentation in large granules, and circular cytoplasmic strands. With Marchi's stain black globules and granules appeared either scattered throughout the preparation or in linear series corresponding to the stellate fibers of the convolutions.

The spheroidal and cuboidal glia cells (oligodendroglia) were in part in a state of development, partly in a regressive state leading to pyknosis and the formation of coarse clumps of chromatin and fragmentation.

The astrocytes appear hypertrophic and hyperplastic to the extent of forming glial tufts.

The blood vessels appear diffusely dilated, very tortuous with the constituents of their walls for the most part in a state of regression. Here and there were observed adventitious cells loaded with fat globules (Herxeimer's method).

In those dogs of this series which had several shocks close together there are seen zones in which the vascular network is especially evident. In these vessels, especially in several of the larger trunks (arterioles, venules, and precapillaries) there is swelling and proliferation of all the cells in the walls, with no true cellular infiltration of an inflammatory type (productive). Such

zones are met with predominantly at the bottom of sulci where grave cellular alterations are especially marked and even necrobiotic forms are found.

Moreover there is a moderate degree of thickening of the pia arachnoid in which are irregular cavities and blisters often large enough to produce compression of the underlying brain substance. This can be observed very well especially within the sulci. Not infrequently along the first portion of the vessels which penetrate the brain substance from the pia there are found in the (artificial) spaces between the vessels and the nervous tissue numerous "perivascular bodies," shreds and fragments of glial protoplasm, perhaps also residuals of albuminoid substances coagulated by the fixatives, which furnish evidence of edema fluid.

In the dogs of Group II as contrasted with those of Group I there is noted a smaller number of cells showing acute changes, a considerable number of cells with grave irreversible changes, and zones with rarefaction of the nerve cells in which cellular remains are encountered. These changes are indicative of marked hypertrophic and hyperplastic activity on the part of the glia. There is noted also retraction and tortuosity of the finest capillary network which undergoes regressive changes leaving behind relics of these changes in the form of numerous columnar cells with linear nuclei or more or less twisted in bizarre forms. Not infrequently in these very zones the larger vascular trunks are a prey to the productive process mentioned before. In these dogs the pia mater appears notably thickened and the convolutions irregularly atrophic.

Summary: In dogs which are given a few shocks close together and which die in insulin coma there are observed very acute, diffuse, edematous alterations which are very probably reversible. But there are observed also in many neurons (cells and fibers) very severe irreversible changes with wide distribution. Moreover, at certain spots there are more or less advanced areas of necrotic destruction of the nervous elements, with productive reaction on the part of the vessels.

In dogs which are given many shocks close together and which do not die in insulin coma there are noted on the whole analogous manifestations except that the acute edematous changes are found to be less diffuse. But the areas of cellular rarefaction are still

encountered. They often involve different layers of the cortex and are not infrequently sharply bounded by less damaged areas of cortex, in which the architecture of the parts is recognizable.

Such sharp demarcation suggests that these areas are related to circulatory disturbances. This relation is very important from the physiopathogenetic point of view so that further study will be necessary and is now being contemplated.

We may conclude from these researches that in dogs the therapy with repeated insulin coma not only brings about the destruction of a certain number of cortical neurons scattered here and there (presumably the less resistant neurons higher in the evolutionary scale), but also causes the production of patches in which along side of the destruction of specifically nervous tissue, there is a lively proliferative reaction on the part of both neuroglial tissue and blood vessels.

15. RESEARCHES ON THE PERMEABILITY OF THE BARRIER BETWEEN THE BLOOD AND THE CEREBROSPINAL FLUID IN SCHIZOPHRENIA AND THE INFLUENCE OF THE INSULIN SHOCK THERAPY ON THE BARRIER PERMEABILITY

W. M. FORSTMEYER [1]

I take the liberty of making the following report with respect to my researches concerning the permeability of the barrier between the blood and the cerebrospinal fluid in schizophrenia and of asking the question whether the barrier is possibly influenced by the insulin shock therapy. Since we have all striven to approach the basic problem of this disease and also of the nature of the modern treatment by Sakel's method, it seemed important to us, in spite of the frequent studies and many conflicting reports that have already been made about the permeability, to raise the question anew with particular reference to the reported changes possibly occurring during or after the hypoglycemic treatment. I employed the method of L. Leipert and O. Waltzlowek, which makes possible exact results. I shall briefly outline the principle. In a closed

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apparatus the organic substance is broken down with potassium bichromate and sulphuric acid and the liberated halogens, chlorine, and bromine are then bound in previously prepared sodium hydroxide. The resulting bromide and hypobromide are then oxidized to bromate with hypochloric acid. The resulting bromate is iodometrically determined.

Our patients received bromide for 4-6 days, the doses averaging 4 g. daily, in accordance with Walters' procedure, and, in case the period of bromide administration was shortened, 6-8 g. daily. 24 hours after the last dose, samples of cerebrospinal fluid and blood were taken from the patient, fasting.

15 cases were included in the experiments. Of these seven were recent cases, that is, their illness was of less than a year's duration. 7 were of more than a year's standing, and 1 was predominantly pseudomanic. The tests were made before the insulin treatment began, on the average twice during the insulin treatment, and after the close of the treatment but before the discharge of the patient. During the treatment, to spare the patient, the spinal punctures and blood taking were done during the deep coma, since experience taught us that there was danger of marked psychic alteration in patients who were punctured outside coma. But when we made the spinal puncture during the coma, we were unable to observe any influence on the depth of the coma or any change in the arousal from the hypoglycemia. We also found no indication that the puncture caused any psychic consequences after the awakening from the shock. I should like to remark, in passing, that the pressure was somewhat heightened with punctures made during unconsciousness but was generally normal otherwise.

Why bromide is generally used to determine the permeability of the barrier between the cerebrospinal fluid and the blood is easily understood if one considers that bromine does not combine with anything in the body. Its concentration in the blood is normally different from that in the cerebrospinal fluid. Moreover, bromine does not affect the barrier between the blood and the cerebrospinal fluid, and, finally, with the usual technique, the blood is not suddenly subjected to any considerable change through the concentration of the substance introduced. The bromine concentration in the cerebrospinal fluid never reaches such levels as a Donnan equilibrium would require under physiological conditions.

The first studies of the permeability were published as early as 1890, and at that time also bromine was used. In 1913 Goldmann reported that there exists a barrier for bromine between the circulation of the blood and the central nervous system. The numerous researches of the last twenty years first brought order into this problem so that we were able to put the question: Is there a difference between normal and psychotic individuals with respect to the permeability of the barrier between the blood and the cerebrospinal fluid? I should like to go very briefly into the theories about this barrier and then report on its permeability in psychotic persons during the insulin treatment.

For a long time most varied researches have been carried on with the most diverse substances in normal and psychotic subjects. It would be beyond the scope of this paper to discuss all these interesting studies and the facts which are to be taken into account. While conclusions of different studies were contradictory, the results agreed in regard to particular questions. So I should like briefly to remind you that Wittgenstein and Krebs came to the conclusion from their researches that the barrier between the blood and the cerebrospinal fluid behaves like a semipermeable membrane, absolutely impermeable to colloids and permeable to crystalloids and dissociated substances. Anions pass through more easily than cations. Zeitlin and Cotzmann reported that when the osmotic pressure in the blood is over 0.8 or under 0.45, it is said to affect the barrier in the sense of strengthening it. Stern and Romel declare that changes in the hydrogen ion concentration increase the ability of the blood to permeate, a fact which aroused our interest during insulin treatment with marked perspiration, etc. But we could demonstrate no changes in this respect.

The histological basis of the barrier between the blood and the cerebrospinal fluid should be briefly mentioned. According to Stern and Gautier this basis is a product of selective properties and defense mechanisms of numerous tissues: the endothelium of the capillaries of the cerebral vessels, the epithelium of the choroid plexus, the ependyma, and the neurolgia. The endothelium of the brain and meninges has the selective function of resistance to substances contained in the blood.

The authors mentioned above report that certain substances are fixed by the nerve parenchyma so that by this means they were able

to show that besides a permeability of the cerebral vessels there is also a permeability of the parenchyma which is subject to the same laws.

All these conjectures affect our subject, all the more because we set ourselves the task of trying by means of studies in the permeability to make a nearer approach to the question of whether and to what extent changes in the endothelium of the capillaries, the epithelium of the choroid plexus, the ependyma, and the neuroglia might take place during the insulin therapy. If we briefly recall what we already know about the permeability of the barrier between the blood and the cerebrospinal fluid, then the following may be stated: Physiological factors such as menstruation and pregnancy cause an increase in the permeability (according to Hoff, Heilig and Leopoldi). In youth the permeability seems to be heightened and does not undergo any kind of change later on.

Lina Stern, for example, reports that physico-chemical factors appear in 87% of the cases of chronic gas poisoning, indeed it amounts to a disturbance in the equilibrium and hemolysin appears in the cerebrospinal fluid. Great quantities of alcohol also give positive results.

The rise and fall in the hydrogen ion concentration through inhaling CO_2 causes a rise in permeability.

Flanteau reports that adrenalin, pilocarpine, and eserine show no influence on the barrier between the blood and the cerebrospinal fluid, a fact important for our problem, because adrenalin is frequently used in conjunction with the insulin shock therapy. Others have also reported similar findings. Whether relatively frequent spinal punctures within short periods of time as we did them on our patients, can change the permeability of the barrier between the blood and the cerebrospinal fluid is also an important question. Dercum and Hahn were of the opinion that repeated punctures increased the permeability, but Labord came to the conclusion that they have no influence on the permeability of the meninges.

I have mentioned earlier that meningeal permeability presents an important factor in the function of the barrier between the blood and the cerebrospinal fluid. The meningeal permeability undergoes changes chiefly by infectious factors, for example, by the spirochete of syphilis, aseptic and tuberculous meningitis. In patients with schizophrenia one should therefore not expect a greater than normal

variation in Walter's quotient because there seems to be no infectious agent present. However, the researches at the Vienna clinic did show certain variations in the barrier between the blood and the cerebrospinal fluid in schizophrenic patients, studied in serial investigations, changes which, though slight as such, still were so constant that the matter had to be studied. And indeed, in cases where active schizophrenic symptoms were present, a slight rise in permeability was demonstrable, and, on the other hand, in the chronic cases and those with remissions a decrease in the permeability could be observed; these findings agree with those of Vladimir Nicolajev. This author, in his interesting work, alleges that apparently the degree of the permeability is dependent on the acuteness of the schizophrenic process, the greater its activity the more striking the rise and the later the fall in the permeability. The rise of the permeability of the membrane is most frequently accompanied by the presence of active symptoms of the process and the fall in permeability is generally seen with remission. This is considered by the author to be a "reversible proceeding which belongs to a broader stage of the process and usually precedes the appearance of a remission or the transition to the stage of chronic deficiency." Walter, as well as Leipert-Watzlawek, arrives at different results, namely that the variations in the Walter-quotients, that is, bromine mg.% in the blood divided by that in the cerebrospinal fluid, are somewhat elevated but approach normal values. It is not evident whether he was working with patients in whom there were symptoms of an active process.

What, then, is the state of permeability during the insulin shock treatment? One may say briefly that the insulin treatment in itself causes no demonstrable changes in the permeability. The quotient varies from 1.79 to 4.52 mg.%. (See table on p. 138.)

Since the permeability of the barrier between the blood and the cerebrospinal fluid is primarily dependent on the endothelium of the vessels of the brain and meninges, any immediate change in the permeability during the hypoglycemic treatment is not to be expected. It is well-known that, even in large doses, insulin does not attack the endothelium of the vessels. Consequently any change in permeability which might occur would be discernible only after a considerable lapse of time.

We may find certain parallels to this fact in Paulian's researches in progressive paralysis. Paulian reported two years ago on the permeability in this disease and the effect of the malaria therapy on the permeability. He came to the conclusion that permeability could be used as a test procedure. He was able to demonstrate that after malarial treatment which was successful the permeability was diminished and he believed he could assume a healing of the anatomical lesion in the barrier.

Inasmuch as the spinal fluid becomes clear only after a considerable time in the case of the malaria treatment, it is conceivable that

PERMEABILITY TABLE

No.	Before treatment	During treatment		After treatment	
	Br. Qu.	Br. Qu.	Br. Qu.	Br. Qu.	
1	3.21	3.11	3.15	3.05	
2	2.98	3.05	3.15	3.17	
3	4.52	4.23	4.17	4.22	Duration of illness more than 1 year
4	4.13	4.76	4.06	4.23	
5	3.98	3.78	3.89	3.87	
6	4.01	4.00	4.12	4.11	
7	3.99	3.89	3.78	3.89	
8	2.76	2.66	2.54	2.43	
9	2.13	2.09	2.20	2.08	
10	1.91	1.89	1.92	1.99	Duration of illness 2–12 months
11	2.23	2.02	2.16	2.34	
12	2.22	2.06	2.16	2.21	
13	1.87	1.88	1.86	1.79	
14	1.99	1.98	1.89	1.99	
15	2.81	2.76	2.98	2.99	Mixed psychosis

the permeability does not change until months after the end of the hypoglycemic treatment, so that a control puncture would be indicated, approximately after six months, in order to get clarification on this subject. Since my experiments at the clinic began only about 4 months ago, my tentative results concerning the state of the barrier between the blood and the cerebrospinal fluid in the hypoglycemic treatment of schizophrenia cannot be taken as final. One might then perhaps draw prognostic parallels with respect to the permanency of the cure. I shall refrain from reporting the results of my control researches; at any rate, one meets with difficulties in trying to induce a patient who has been cured to offer himself voluntarily for spinal puncture.

In conclusion I should like to say that in the 15 patients studied the results of Nicolajev have been confirmed. He found that increased permeability of the membranes most frequently occurred in connection with symptoms of an acute schizophrenic process and decreased permeability in cases of remissions and transitions to chronic phases.

No direct influence of the insulin therapy on the permeability could be demonstrated. My researches so far have run only a short course and have concerned too few cases to allow me to take a more positive stand on the following questions: whether, on the one hand, the degree of permeability may be taken as a prognostic indicator in the insulin therapy. I refer to the equation: Symptoms of an acute process = increased permeability. On the other hand, there remains the question whether a change in permeability may occur after a considerable time of full remission and whether such change, in case it should prove to be constant, may not be used as a prognostic means of forecasting further continuance of the remission or the danger of relapse.

16. THE BEHAVIOR OF THE ACTUAL BLOOD SUGAR DURING THE INSULIN SHOCK

RUDOLPH FREUDENBERG, VIENNA-LONDON

The blood sugar during the insulin shock in schizophrenia has already been investigated by Sakel, and briefly by Heilbrunn. They treated the determination of the so-called total reduction which includes not only the actual blood sugar but also the so-called rest-reduction, a non-fermentable remainder of reducing substances left behind after the addition of yeast to the blood sample. According to Rabinowitch this remainder normally comprises 16-30 mg.%. It is composed partly of uric acid, creatinine, and creatine which together make up 5-10 mg.%. The chief remaining substance, according to Herbert, Bourne, and Groen, is glutathione, a cystine coupled with glutamine glycine, which with the catalyzing help of traces of iron acts, according to Warburg, in the oxygen respiration of cells. The total reduction is therefore composed of the actual blood sugar and this remainder.

It seemed to us of interest to investigate the relation of the actual blood sugar to the remainder during the insulin shock in order to see whether anything could be said about the relation of the actual sugar content and the hypoglycemic phenomena.

Our curves were made in phase two of the treatment. For every patient 10-12 blood samples were taken between the injection of the insulin and the awakening. The sugar determinations were carried out in accordance with the method of Hagedorn-Jensen at the Pharmacological Institute in Vienna. For every blood sample the total reduction and the rest reduction after fermentation were determined. We also made a control study for each value.

In ½-1½ hours after the injection the actual blood sugar had sunk to a minimal value of 8 (total reduction 23) mg.% and a maximal of 30 (total reduction 35) mg.%. During this initial fall our patients showed no hypoglycemic manifestations of any kind; these first appeared after, not during, the initial steep fall. The deeper and quicker the fall the earlier they appeared. Thus, for example, they were evident once at a level of 14 (total reduction 27) mg.% with the lowest point of the initial fall coming ¾ of an hour after 80 units of insulin. But more often they were not observed until the actual blood sugar had stood below 30 mg.% for ½-1¾ hours. In several patients, after the initial fall, there appeared one or two short rises and then another fall during which the hypoglycemic symptoms were decidedly more pronounced.

In our cases coma began after the blood sugar had stood at least one hour and twenty minutes, at most two hours and fifty minutes, below 30 (total reduction 35) mg.%.

In one case, for instance, the actual blood sugar fell in 1½ hours after 120 units of insulin to 30 (total reduction 35) mg.% and then for 2½ hours it wavered between 19 and 28 mg.% and at that point coma set in, that is, not at the time of the lowest blood sugar, but 45 minutes later. When the value spontaneously rose to 40 mg.%, the patient awoke.

In the case already mentioned in which the actual blood sugar fell to 14 mg.% in ¾ hour after 80 units of insulin (total reduction 27 mg.%) and later fell still lower, coma set in one hour twenty minutes after the initial fall to 14 mg.%. Half an hour after the initial fall the actual blood sugar fell to 12 (total reduction 23) mg.%, after the second half hour to 9 (total reduction 21) mg.%.

During coma it fell again to 2 mg.%, practically to zero since 2 mg.% is within the limits of error. The coma was interrupted after 1½ hours. During the period of unconsciousness all reflexes were preserved and no pathological reflexes appeared although the actual blood sugar remained below 14 mg.% for a total period of two hours and fifty minutes and fell practically to zero.

In another case the actual blood sugar fell after 80 units of insulin in 35 minutes to 30 (total reduction 40) mg.%, half an hour later to 27 (total reduction 42) mg.%, and in the next half hour to 8 (total reduction 23) mg.%. It continued below 10 mg.% until interruption of the hypoglycemia. Coma set in after the blood sugar had been below 30 mg.% for 2¾ hours. During coma it fell to 4 mg.% (total reduction 13) and remained at that level until its termination. The corneal reflexes were absent and the Babinski positive after one hour of coma just before sugar was given. The total duration of hypoglycemia below 30 mg.% amunted here to 3¾ hours.

In another case 13 mg.% (total 15) was reached 65 minutes after the injection of 155 units of insulin. 1¾ hours later coma set in. During the coma the blood sugar was not significantly changed: it fell gradually to 11 mg.%. After two hours of coma, 10 minutes before its termination, while the blood sugar was 13-11 mg.% hypotonus appeared with absence of corneal and withdrawal reflexes. The total duration of hypoglycemia below 30 mg.% was three hours and fifty-five minutes.

In three patients an interval was allowed to elapse between the tube feeding during coma and the meal. In all there was a further slight fall in blood sugar.

The rise to normal blood sugar after food took place in the cases investigated always in less than ½ hour. The patients awoke with values from a minimal of 52 mg.% to a maximal 96 mg.%. The faster the rise the sooner the patients awoke regardless of low blood sugar values. It follows that the tempo of the rise, not, as might be expected, merely the level of the blood sugar, is important in determining the time of awakening.

The fluctuations in the blood sugar were accompanied by fluctuations in the rest reduction. Its value at the outset was in one case 17 mg.%, in the others always below 13 mg.%, for the most part, then, below the lower limit of normal. In rabbits, according to

Dotti, the non-fermentable substances remained normal during insulin convulsions, while the actual blood sugar fell to practically 0. He terminated the hypoglycemia after the first convulsive manifestations. In our cases the rest reduction fell from a maximum of 17 mg.% to a minimum of 0 during severe hypoglycemic manifestations. In deep coma the values were never higher than 9 mg.%. Concerning the meaning of this fall only conjectures can be offered.

In conclusion we may say that the first symptoms of hypoglycemia make their appearance the earlier, the more rapid and the greater the fall in actual blood sugar values is. For the most part they come on after the initial fall. Coma began only when the blood sugar had been below 30 mg.% for at least one hour and twenty minutes. The lower the blood sugar values the earlier the onset of the coma. The actual blood sugar may be practically zero with all the reflexes still well perserved. Their loss follows only a sufficiently long period of hypoglycemia. The depth of the coma is dependent chiefly on the total duration of the hypoglycemia.

The rest reduction may also fall to zero. Perhaps the concomitant diminution of glutathione is related to the disturbance in oxygen utilization in hypoglycemia referred to by several authors (Holms, Dameshek, Myerson, and Stephenson).

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II. PROCEEDINGS ON SUNDAY, MAY 30, 1937

17. CEREBRAL DISORDERS IN PROVOKED HYPERINSULINEMIA

By G. de MORSIER, Geneva, and H. BERSOT, Le Landeron

In 1933 one of us, with Dr. Mozer, observed a physician—a morphine addict—who was completely detoxified with insulin. One evening after having injected himself with a certain quantity of insulin, he fell asleep before taking sugar. The following day he was found in coma, and in spite of the administration of a considerable quantity of glucose he died three days later. He had had attacks of muscular stiffness with extension of the legs, flexion of the arms, a tetani-form attitude of the hands and feet, muscular twitchings, upward deviation of the eyes and various pyramidal signs. The histological examination of the brain showed the existence of areas of necrosis, with peri-vascular gliosis, in the form of stellate plaques, similar to those which Stief and Tokay have found in experiments on rabbits. To our knowledge it is the first anatomo-clinical case of hyperinsulinemia known in man which ended in death, which did not present any lesion (Figures 1 and 2). The neurological symptoms presented by this patient during the three days of coma impressed us vividly but we did not know how to interpret them. Since 1935, after Sakel's discovery, one of us has treated schizophrenic patients with insulin and has employed the cinematographic method to study the curious and varied motor phenomena which appear in the course of the treatment and which disappear after the injection of glucose. The study of these phenomena is of considerable interest. There is no doubt, as a matter of fact, that insulin constitutes or presents the most powerful and subtle reagent heretofore known capable of provoking the phenomena of disintegrating the cerebral functions. Up to the present time these complex motor phenomena had appeared only very seldom in case of certain spontaneous lesions, as we shall see presently. Insulin permits experimental production of these phenomena and makes it possible to study them completely and in detail. The

terms "insulin shock" and "insulin coma" used by the first authors who practiced the insulin therapy do not seem to be sufficiently precise to characterize the observed phenomena. That is why we use

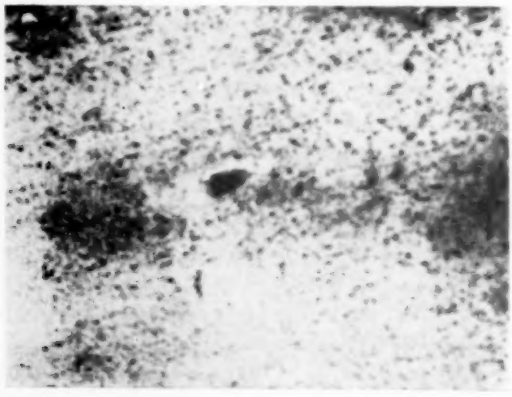


FIG. 1. Cerebral lesions in fatal hyperinsulinemia in a patient after three days of coma. Proliferations (nevroliques) in form of a wreath around a vessel. (Nissl.)

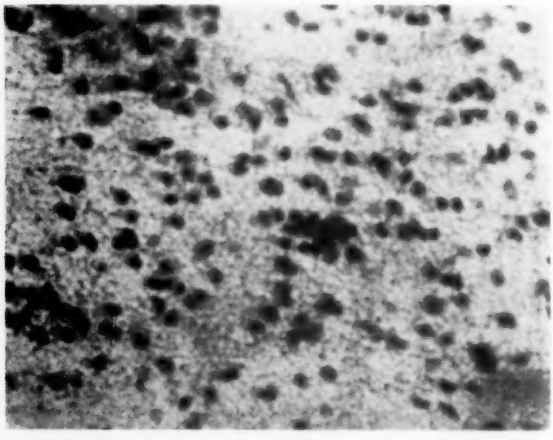


FIG. 2. The same slide greatly magnified. Neuronophagia.

the term "cerebral disorders in provoked hyperinsulinemia," which obligates us to analyze precisely the numerous and varied disorders shown by the patients. But these phenomena, apparently so extraordinarily varied and fantastic, are not infinite. A careful study

of the patients and of the films allows one to subdivide these phenomena into well-defined types. One observes:

1. Pyramidal symptoms; transitory hemiplegias; exaggeration of the tendon reflexes; disturbances of the cutaneous reflexes with a positive Babinski.

2. Muscular twitchings or myoclonic movements of the face, neck, and limbs, especially the hands and the fingers.

3. Tonic spasms of the face: grimaces; trismus; gnashing of the teeth; protrusion of the tongue; spasm of the glottis; protrusion of the lips resembling the mouth of a fish. (Fig. 3).

4. Spasms and tonic movements of the extremities and of the trunk; forced grasping; elevation of the arms with adduction and hyper-pronation; spasm of the limbs in extension and flexion; spasm of the crossed legs. Forced movements of the body and the eyes in different directions are particularly frequent and important. One observes torsions (pleurosthotonus), forced movements in the sagittal plane (opisthotonus and superior oculogyric spasm or emprosthotonus with inferior oculogyric spasm), forced movements in the horizontal plane; deviation of the head and eyes and lateral flexion of the body (Figures 4, 5 and 6). These forced movements of the body, head and eyes may occur on one side only or they may take a pendular form (spasm of nutation)—that is, they may move alternately from one side to the other with a more or less rapid rhythm.

In certain cases one observes crossed reflexes, that is, reflexes involving movements of the upper limb on one side and of the lower limb on the other side (reflex trot). Similar crossed reflexes have been observed by Pötzl and his collaborators in cases of frontal lesions in man and by Minkowsky in a fetus of fifteen centimeters.

Forced tonic movements, torsions and twistings are very important: they can be provoked by any extraneous excitation—sensory or auditory—or by an emotion. One of our patients, a few moments after the termination of insulin treatment by administration of glucose, heard noises in the nearby room; a new opisthotonic crisis took place immediately. Such phenomena are commonly considered a characteristic of varied conditions known under the name of hysteria or pithiatism. Insulin shows that these phenomena occur in certain well-defined physiopathological conditions.

5. Complex iterative and rhythmic movements, like intentional movements known now under the term of "catatonic movements"; rubbing of the head and of the mouth with the hands, iterative movements of the arms, pedalling movements of the legs, asynergias



FIG. 3. Hyperinsulinemia: deviation of the head and eyes to the right, protrusion of the tongue, flexion of the arms with myoclonic movements of the fingers, and opisthotonos of the trunk.



FIG. 5. Hyperinsulinemia: Emprosthotonos, flexion of the legs with hyperadduction of the thighs which are crossed (scissors-like).



FIG. 4. Hyperinsulinemia: extension and hyperpronation of the left arm, flexion of the right arm and left leg.



FIG. 6. Hyperinsulinemia: Rolling about the longitudinal axis to the left with facial spasms and flexion of the fingers.

between the two sides of the body, each side executing iterative movements in different rhythms.

These movements called "catatonic" are like the movements just mentioned; they are related to the disintegration of the motor functions. They are too complex to be experimentally reproduced by localized excitation of the cortex, but one sometimes observes them in cases of circumscribed lesions, tumors, or hematomas

gradually compressing the cortex. Thus insulin has made it possible to study experimentally the catatonic agitation, as bulbocapnine has made it possible to study experimentally catatonic stupor.

6. Epileptic crises of the common type.

One also observes in the course of insulinemia the whole gamut of sensory symptoms from the most subtle to the most obvious. This study was carried out remarkably well by Benedek in normal individuals. One meets with:

1. Disorders of the general sensibility: sensation of coldness and warmth: diverse sensory agnosias, disorders in the awareness of oneself which may reach definite depersonalization.

2. Visual disorders: macro- and micropsias, metamorphoses, chromatopsias, complex visual agnosias, with disturbances in the notion of space which may reach a feeling of strangeness so characteristic of certain psychoses; and visual hallucinations.

3. Auditory disorders: hyperacousia, auditory and verbal hallucinations.

4. Olfactory disorders: parosmias and olfactory hallucinations.

5. Vestibular disorders: vertigo, feeling of gyration, or of lightness.

Benedek investigated the caloric vestibular reactions during the hypoglycemia. He found in certain cases the disappearance of the short nystagmoid movement and paradoxical reactions: slow twitching which was predominant on the side opposite to the direction of the fall. He also noticed a marked diminution of the caloric excitability. These different reactions are similar to those which one observes in central vestibular lesions.

6. Aphasic disorders.

Finally, one commonly observes vegetative symptoms: in all cases perspiration, marked salivation, more or less profound sleep, vaso-motor disturbances, particularly of the face, disorders of temperature regulation, in which temperature may fluctuate between 35° and 39°, and disorders of the cardiac and respiratory rhythms.

It is now possible to sketch the pathogenesis of these different motor and sensory symptoms in considering the topography of the cortical areas such as those established by Förster in man, by direct electrical stimulation of the brain. In examining the scheme of Förster (Figure 7), one is struck by the fact that the pyramidal area constitutes only a very small part of the cortex as compared

to the frontal or parieto-temporal extra pyramidal areas which comprise the largest portion of the brain. Inasmuch as insulin

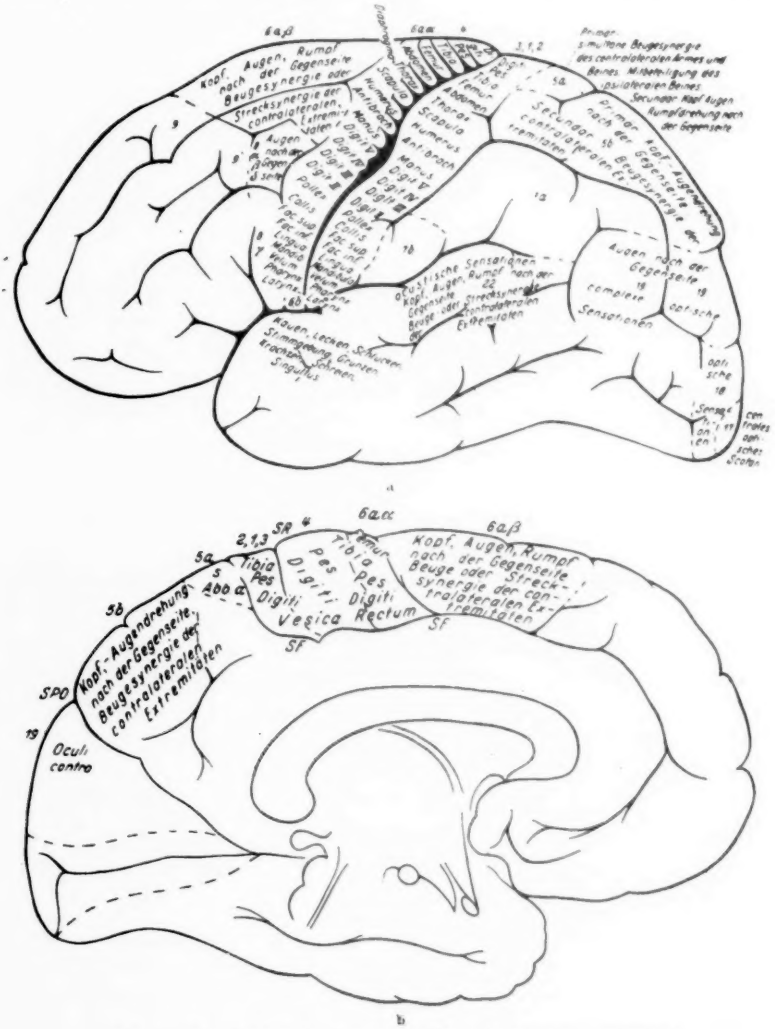


FIG. 7. Pyramidal and extra-pyramidal cortical areas. (Förster.)

reaches the brain through the blood-stream and impregnates the whole brain, the extra-pyramidal symptoms are more numerous and more important than the pyramidal symptoms. The forced

movements, the torsions, the twistings, the tonic spasms of the legs—in flexion or extension—are provoked by excitation of zones 6 a α, 6 a β, 5 a, 5 b, and 22 of Brodmann-Vogt. The movements of the face, mouth and tongue depend on the zone 8γ, while the complex movements of mastication, deglutition, licking, vocal expression, grunting, crying out, and hiccoughing are related to the area 6b. The area 8a β δ, and the area 19 controls the movements of the eyes only.

The sensory phenomena, auditory and verbal hallucinations and hyperacousia, are under the control of the area 22; while perturbations in areas 18 and 19 are responsible for the visual disturbances—amblyopic and hallucinatory. It is the region of the inter-parietal fissure which is one of the most important centers of the cortical vestibular pathways, as one of us was able to prove in an anatomo-clinical case of trauma, localized in this region. Between the visual and the vestibular areas in the region of the angular gyrus is the vestibular visual center which is responsible for the appearance of complex phenomena; provoking at the same time such visual and vestibular perceptions as macropsia, micropsia as Hoff has shown. Finally, excitation in the extra-pyramidal areas also controls the appearance of sensory phenomena, parasthesias, sensory agnosias, disorders in the awareness of oneself, depersonalization, feelings which are particularly under the control of the parietal region.

As we already pointed out, the cerebral disorders caused by insulin therapy had already been observed, in other pathological conditions, before the discovery of Sakel. As a matter of fact, in the clinic one often sees phenomena which are perfectly analogous to those provoked by hyperinsulinemia. In the first place, one observes epileptiform crises which are considered as "atypical" or "hysteriform"; then certain agitations called "catatonic"; and finally the complex motor syndrome to which Zingerlé has recently attracted attention under the name of "*automatose*" which, however, has been perfectly described since 1881 by Charcot and Richer as a "major hysterical attack" (Figure 8). It is the possibility of reproducing these syndromes experimentally and observing them daily which renders the provoked hyperinsulinemia so important for studies of the physiopathology of the brain.[1] One finds the

[1] Certain neurologists have recently considered hysteria as being closely related to striatal syndromes and others have strenuously objected to this

the syndrome of *"automatose"* in vascular or neoplastic lesions in the extra-pyramidal areas—temporal, parietal or frontal. One also finds it in cerebral contusions in the first hours or days following the trauma. One finds it, as well as aura, in certain epileptic crises; in cases of reversible vascular lesions in patients with hypertension, in certain uremic and diabetic patients, and finally in inflammatory neuraxites with lesions located predominantly in the extra-pyramidal areas of the brain. One of us has recently had the occasion to observe several cases of *"automatose"* which were pre-



FIG. 8. Two drawings taken from the book of Richer: Clinical studies on hystero-epilepsy or major hysteria. Paris, 1881. Compare the upper drawing with our Figure 6 (scissors-like position) and the lower drawing with our Figure 7 (position of the hands and fingers, legs, head and face).

sented before either the Swiss Neurological Society in June, 1936 in Geneva, or before the International Oto-Neuro-Ophthalmological Congress in Geneva in May, 1937. The cinematographic films

concept, pointing out—wisely so—the differences which exist between the striatal syndromes and the so-called hysterical phenomena which they believe to be caused primarily by imitation and simulation. Studies of the syndromes of *"automatose"* and cerebral hysteria made us think that certain phenomena regarded as hysterical find explanation neither in the concept of simulation or imitation nor in that of perturbations in the region of the central nuclei. They are, on the contrary, easily explainable as disorders involving chiefly the extra-pyramidal cortical areas.

taken during the crisis of these patients show vividly the analogy between the extra-pyramidal syndromes which are due to hypoglycemia and those due to other causes. One sees the same forced tonic movements: deviations, spasms, twistings, opisthotonus, grimaces, iteration (Figure 9). The same spasmodic nodding of the head thus appears in an individual with hypoglycemia caused by insulin, and in a diabetic with hypertension. These facts are important because they distinctly show the non-specificity of cerebral reactions.

The discovery of Sakel therefore not only constitutes a very remarkable treatment of schizophrenia but it moreover offers an absolutely new and fruitful method for study of the physio-



FIG. 9. Rolling around the longitudinal axis in neuraxitis with the syndrome of automatism. Flexion of the left forearm and extension of the right one.



FIG. 10. Spontaneous opisthotonic crisis in neuraxitis with the syndrome of automatism.

pathology of the brain. It is in the comparative study of the cerebral phenomena provoked by hyperinsulinemia and the syndromes of *automatose* observed in the clinic, that one will learn to understand physiological determinism, particularly in those conditions which are still studied under the name of psychosis and neurosis.

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18. "INSULIN" SHOCK AND "ANALEPTIC" SHOCK IN RABBITS

By V. DEMOLE[1] and H. BERSOT[2]

The insulin shock and the analeptic shock have different symptomatologies in rabbits and in men.

One hour after the subcutaneous injection of one international unit (U. I.) of insulin, the blood sugar went down below 50 mg.%, and the first symptoms of shock appeared, in the form of apathy or agitation with hyperactive reflexes. The hypoglycemic coma is preceded by diverse prodromes: fatigue (ventral position of the animal), exophthalmos, acceleration of the breathing, immobility, awkwardness. The crisis differs in intensity in various animals; it generally occurs several times successively—each crisis lasting a few minutes—and terminates either by recovery or by death.

Suddenly the animal has clonic convulsions. Lying on the side, it goes through rapid movements, usually well co-ordinated. At the same time, there are abnormal attitudes, conditioned by the exaggerated tonicity of certain groups of muscles (opisthotonus, Figure 1; emprosthotonos, Figure 2). Often the animal appears to be affected by a torsion spasm (Figure 3), it rolls over around its longitudinal axis or it alternately turns over on the left and right side. One sees isolated muscular twitchings which either affect successively the anterior and posterior limbs, or remain localized in certain groups of muscles, for example, in those of the face.

[1] Basel.
[2] Bellevue Clinic, Le Landeron.

The injection of a convulsive dose of analeptics immediately provokes violent clonic attacks. The movements are more rapid than in the insulin attack. They are co-ordinated and of the galloping type. Often the attack is preceded by a brief period of tendon hyperexcitation, with fibrillar tremors, muscular twitchings, exaggeration of cutaneous reflexes, exophthalmos, opisthotonus. Sometimes (Figure 4) the crises repeat themselves without interruption;

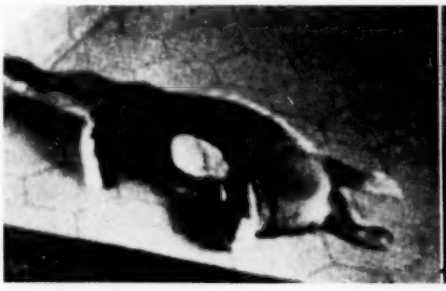


FIG. 1. Insulinized rabbit in opisthotonos.



FIG. 2. Insulinized rabbit in emprosthotonos.



FIG. 3. Torsion movement in an insulinized rabbit.



FIG. 4. Violent opisthotonos provoked by the injection of an analeptic.

at other times they are separated by intervals during which the animal becomes more or less conscious. Often the muscles undergo isolated twitchings. Death usually takes place during a tonic spasm in extension.

The hypoglycemia which is always present in insulin coma is regularly absent during the coma produced by analeptics. On the contrary, in the latter, one finds hyperglycemia which is either mild or very accentuated, reaching in certain of our experiments over 200 mg.% of glucose.

The film which we are going to project shows that in rabbits during the insulin shock one finds most of the extra-pyramidal symptoms described by Bersot and De Morsier[1] in man (Myoclonias, myotonias, spasms of the face, opisthotonus).

19. CONTRIBUTIONS TO THE HISTOPHYSIOLOGY OF INSULIN

H. E. SCHMID, MÜNCHENBUCHSEE

I

If this subject, which I shall barely touch on, has, from its nature, no obvious connection with those which have occupied this meeting, then it must be remembered that by now we have a considerable literature on the organic changes, some of which are very important, referred to as being caused by insulin; consequently this hormone which serves for the maintenance of the normal vital structure and function may become fatal if it is administered in excess of physiological amounts. From a dread of these—sometimes very serious—organic injuries, there arises in every physician who learns for the first time about the method of Sakel's insulin treatment an instinctive inner abhorrence for a therapy which seems to ignore the *"primum nil nocere."*

A priori, both from theoretical considerations and from the clinical picture of hypoglycemia, it may be concluded that three organ-systems are chiefly exposed to the effects of insulin: the endocrine, the vascular, and the nervous. A large number of investigations have disclosed that such is actually the case. At the same time it must be remembered that the effects which come from hyperinsulinemia, whether they be primary and due to adenoma of the islands of Langerhans or secondary and caused by the injection of large quantities of insulin, are first of all functional and only secondariiy organic injuries, or perhaps we should better say alterations, and that the organism as a whole reacts in its totality, and not the individual organ-systems as such. It is therefore not to be assumed that all the anatomical findings are simply and solely to be charged to insulin, but we have also to consider

[1] Bersot, H.: Ann. Méd. Psychol. November 4, 1936.—De Morsier and Bersot: Swiss Congress of Psychiatry, Münsingen, May 29-31, 1937.

those alterations which show us the result of a disturbed equilibrium between the endocrine and the autonomic systems, due to hyperinsulinism.

Up to a certain point insulin holds a place apart from all the other hormones. For not only is it a substance of absolutely vital importance—not all of the hormones are—as Grab showed in his general report, but it is the only hormone that is so far known to be histotropic, as v. Muralt has recently expressed it, in contrast to adrenalin, which is to be looked on as distinctly ergotropic, that is, above all it mobilizes the energy-spending materials while insulin just as definitely hoards them.

Researches so far carried out, concerning the histophysiology of insulin, have all tended to demonstrate the effects of insulin in causing morphological alterations in the most dissimilar organs. These were consequently strictly scientific studies and up to the present have shown the following results:

According to our present information, the first and most extensively to be affected by the insulinogenic alterations is the central nervous system, as the most extraordinarily astonishing clinical reports of hyperinsulinism would lead us to believe. The authors, among whom I shall chiefly wish to mention Gazzano, Stief and Tokay, de Morsier and Mozer, Wohlwill, Bodechtel, Schereschewsky, Mogilnitzky and Gorjajewa, and Tani find pallor of large areas of the cortex, hyperchromatosis of the cell nuclei, Nissl's last stage of ganglion cell degeneration, glial proliferation, sclerosis of Ammon's horn, neuronophagia, and marked capillary hyperemia, alterations which in their very nature are for the most part to be considered irreversible and which are to be traced to two factors: first, to anoxemia and increased lactic acid in the blood as demonstrated by Dameshak and Myerson, Loman and Myerson, and others, and, second, to the preagonal circulatory disturbances. Changes caused by other hormones, for example, adrenalin, as Stief and Tokay have shown, as well as after air embolism (Neubürger), or in a low pressure chamber according to Büchner and Lufft are to a great extent so like those caused by insulin that it is impossible to look upon them as specific.

The situation is somewhat different in the light of our present knowledge of the endocrine field. We know that the various glands influence one another not directly by their hormones circulating in the blood, but by the mediation of the autonomic nervous system.

The influence of insulin on the adrenal glands has been shown to follow the splanchnic nerves in a beautiful experiment of Kahn and Münzer. In a purely physiological experiment with parabiosis Le Barre and Sarie demonstrated a similar autonomic intervention. Every endocrine gland so far investigated shows histophysiological correlation with the island system. It is especially the school of anatomists at Nancy with Collin, Watrin, Drouet, and Florentin as well as Picard and Florentin, and Kahn who have been responsible for the discovery of these relations and counter-relations.

Naturally the adrenal system is preeminently affected, the cortex and the medulla differently according to their different physiological functions. The medulla shows, as Goormaghtight, Elaut, and especially Poll have pointed out, stigmata of excessive functional demands. The tissue loses its chromaffin character, the cells are vacuolized, the nuclei grow larger. This effect is absent after the splanchnic is cut. In the adrenal cortex there appears first a marked deficiency in lipoid material. As the influence of insulin continues there is a conspicuous morphological transformation with assimilation of the various strata and hypertrophy of the entire organ, as Schenk and Langecker have demonstrated.

The hypophysis is affected by insulin, as Houssay has shown experimentally, not *via* the blood but *via* the autonomic nervous system. Cutting the vagus has the same effect on the morphology of the hypophysis as insulin has. Eaves, as well as Collin, Drouet, Watrin, and Florentin, Kahn and others, has demonstrated changes which consist chiefly of an increase in the eosinophilic cells amounting, according to Kahn who made quantitative studies, to 25-42% above normal accompanied by a corresponding decrease in the chief cells. Moreover holocrine colloid formations are found in all three lobes and intravascular colloid in the neighboring regions of the midbrain. The finding of eosinophilia is especially interesting since S. Frank was able to show that the adrenotropic hormone is a product of the eosinophils. The inhibiting influence exerted on the island cells and on insulin itself by the contrainsular hormone of the hypophysis isolated by v. Lucke points to an antagonistic relation of the anterior lobe of the hypophysis toward the island function.

The thyroid shows hyperemia and great decrease in colloid under the influence of insulin. The parathyroid shows much the same picture. The thymus is affected variably.

More important are the changes in the liver, of which marked fatty infiltration may be called the most prominent, while the glycogen, except in rabbits, sinks far into the background. The conversion of glycogen into fat is supported by a number of investigations, those of Abrami, Bertrand-Fontaine, et al., and especially by those of Sopp-Seelbach as well as Vendég. In addition I have shown that a total disappearance of glycogen may take place in conjunction with great fatty infiltration. In certain fishes, concerning which I have reported briefly, an extensive structural reorganization of the liver takes place. Noel and Pallot found grave alterations in the formation of mitochondria.

Quite peculiar and apparently not to be regarded as a direct effect of insulin but as mediated by hormones especially from the hypophysis as well as from the adrenal system is the action of insulin on the islands of Langerhans. It has long since been established especially by Picard and Florentin, but also by other authors that injections of insulin affect the size and number of islands in the pancreas as a whole. There results, as I was able to show, a very definite increase in the number of islands, a greater average diameter, and the appearance of a new crop of islands. No attempt will be made here to decide the correctness of the balance theory of Laguesse, that the islands arise from exocrine tissue. There is an increase not only in the anatomical substratum but also in the insulin content of the individual islands as Aubertin, Lacoste, and Sarie have been able to show. In untreated dogs used as controls each kilo of pancreatic tissue contained on the average 163 units of insulin while animals that had received 5 units twice daily had 270 units per kilo of gland. That functional changes which are demonstrable histologically take place within the islands was shown by Hinteregger, using the method of Lane-Bensley. With a new method of my own, I have been able to confirm his results. It is very unlikely that we have to do here with highly specific alterations determined by insulin. Anselmino, Herold, and Hofmann as well as Bierring, Krischeski et al., were able to obtain essentially the same data after the injection of anterior lobe extract. Picard and Florentin made similar observations after starvation, pregnancy, thyroxin, folliculin, posterior lobe substance, and thallium acetate. The essential point in all these effects appears in general to be an alteration in carbohydrate metabolism.

Concerning the relations to the gonads, there were in the literature to which I had access only meager data, and these pertained chiefly to changes in the ovaries. Crainiceanu and Copelmann found hyperemia and marked luteinization, results which I can confirm from my own experiments.

II

At this point I should like to bring to a close my summary of the literature on the histopathology of insulin and report the results of my own studies. They differ from previous studies in that I set up 3 series of experiments:

1. Untreated controls.

2. Animals which received insulin as in previous investigations and often died in hypoglycemia. They are referred to as "insulin animals."

3. Animals treated as are patients according to the classical method of Sakel. That is to say, coma was interrupted by the administration of glucose at intervals depending on the condition of the animal. These are called "Sakel animals," as they were in my report at the time of the experiment.

To decide the question whether mammals alone react to insulin in this fashion I studied fish last summer and reported briefly concerning them.

With this arrangement it might be expected that a number of alterations in organs, outside the central and endocrine regulatory apparatus as well, which might be reported as injuries due to insulin would not appear or would appear at least only to a slight degree because the organism was not given an opportunity to carry insulinemia to its final consequences. In addition it seemed to me an interesting plan for the light it would throw on Sakel's method of treatment by insulin, especially from the point of view of possible later pathology.

Since I have already reported briefly on the alterations in the central nervous system, I shall confine myself today to a brief discussion of the relations within the endocrine apparatus. In general we can demonstrate grossly hyperemia in all the endocrine glands with the exception of the adrenals which usually appear white in rabbits because of their high lipoid content and thick

capsule. Here I should say that I could demonstrate the diminished chromaffin reaction in my Sakel animals only after prolonged reduction. Even so it is less evident than in the insulin animals. I have no experience with the quotients of free, bound, and latent adrenalin which have been the subject of papers by Utewski and to which a lactic acid function in the tissues of the adrenal medulla has been ascribed. I can only say that the emptying of the glands of the medulla, which we recognize by means of the chromaffin reaction is much less marked than it is with mere insulin poisoning. Likewise the changes in the adrenal cortex are much less impressive than those found by previous authors. The structure of the cortex is well-preserved and in no way shows the great decrease in lipoids reported by Kahn and Münzer. A certain motley appearance of the cortex strikes the eye especially when the fatty acids and neutral fats are stained differentially with Nile blue sulphate. It is due to the predominance of neutral fats in some areas and of fatty acids in others. Moreover, I set up for all the endocrine glands curves to portray variations in the nuclear volume. I shall discuss these curves elsewhere. They disclosed an antagonistic relation between the adrenal medulla and the inmost layer of the cortex on the one hand and the two outer cortical layers on the other. The nuclei of the medulla and *zona reticularis* showed on the average a doubling in their size, while in the *fasciculata* and *glomerulosa* other alterations in nuclear volume consistent with one another appeared. The curve representing nuclear volume for the medulla and reticularis remains almost constant in form, but is shoved to the right upon the abscissa to about a corresponding degree. The curve for the fasciculata-glomerulosa, on the other hand, does not change its place in the co-ordinate system (figs. 1, 2 and 3).

In the hypophysis I was able to confirm the eosinophilia reported by Houssay, Kahn and others. The entire gland is very hyperemic. In all the insulin animals and some of the Sakel animals colloid was found in the anterior lobe and, in agreement with the findings of Collin, Drouet, Watrin, and Florentin, in the vessels as well. This colloid evidently did not have the same composition everywhere, for it was stained now red, now yellow, and now blue, or showed greenish or brownish color combinations. In the hypophysis, too, nuclear volume could be shown to vary according



FIG. 1.



FIG. 2.



FIG. 3.

FIG. 1. Normal suprarenal cortex of a rabbit.

FIG. 2. Suprarenal cortex of a rabbit dead in insulin shock.

FIG. 3. Suprarenal cortex of a rabbit treated by Sakel's method.

FIGS. 1-3. Lipoid staining, with osmic acid. 29 ×.

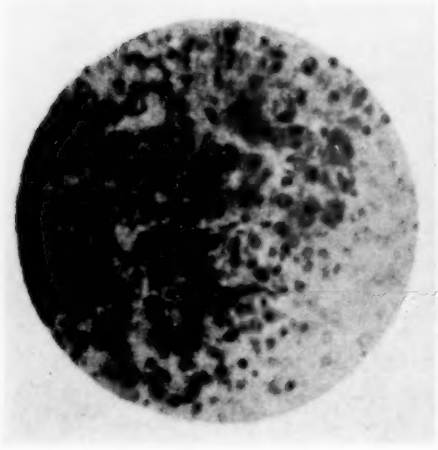


FIG. 4. Normal Hypophysis, Dominic's stain. 342×.

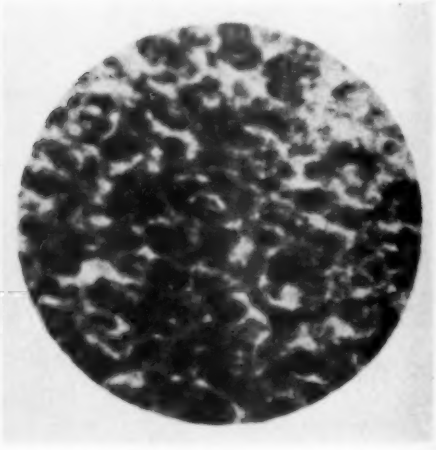


FIG. 5. Hypophysis of a rabbit treated by Sakel's method. Marked Eosinophilia. Stain and magnification as in Fig. 4.

Figs. 4-9 are reduced to ¼ the size of the original photograph.

to regular patterns. The curve representing the controls is a very complicated one with 4 peaks. Closer analysis shows that we obviously have to do with two different curves superimposed one upon the other, each of which has two maxima. Jacobi, Hintsche, and others have established the law of nuclear sizes according to which one and the same organ possesses nuclei of the so-called Regular-class in a range of sizes characteristic of that organ while in smaller numbers also nuclei of R/2, R/4, 2R and 4R appear. I assume and indeed I have almost succeeded in proving that the 2 curves correspond to the chromophobe cell series on the one hand and the chromaphil series on the other. The effect of insulin on the nuclear size and the form of the curve seems to me to support the assumption.

That the *pars intermedia* and the posterior lobe are affected as well as the anterior lobe is clear in the insulin animals. It is at once evident from the increased colloid formation in the *pars intermedia* and from the colloid content of the posterior lobe. In the Sakel animals the situation is different; in some of them large masses of colloid appear in the *pars intermedia*, while in the posterior lobe I have never found such a picture (figs. 4 and 5).

In the thyroid I have been unable to find any histological alterations except hyperemia and marked polychromatophilia in contrast to the controls. There is no essential difference between the insulin and the Sakel animals (figs. 6 and 7).

In the liver the rabbit shows a picture different from that of other animals since the conversion of glycogen to fat which appears so often in the others is absent. It has been demonstrated for other animals by Abrami, Bertrand-Fontaine, Wallich, Didier, Closon and others. I myself observed it in Scorpaena porcus. But in the rabbits that met their death in insulin convulsions large quantities of glycogen were found. Goldblatt and Corkil have called special attention to this pecularity. The size of the nuclei in the liver cells is shown likewise to undergo on the average a slight increase in both the insulin and the Sakel animals. On the other hand, the great increase in the number of nuclei by amitosis, which I have demonstrated in scorpaena porcus, seems to be lacking in mammals. I have never seen the changes in the mitochondria of the liver cells which Noel and Pallot reported in animals subjected to enormous doses of insulin.

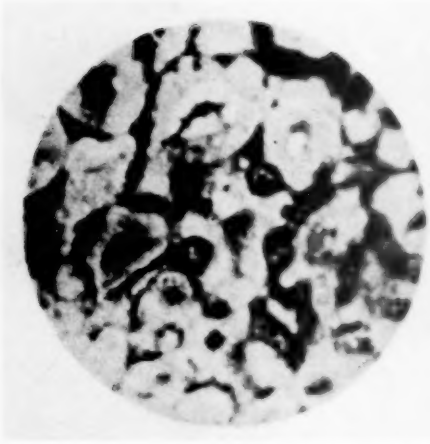


FIG. 6. Thyroid of an insulinized rabbit, marked hyperaemia. Eosin-phosphomolybdic acid-aniline blue. Magnified 342×.

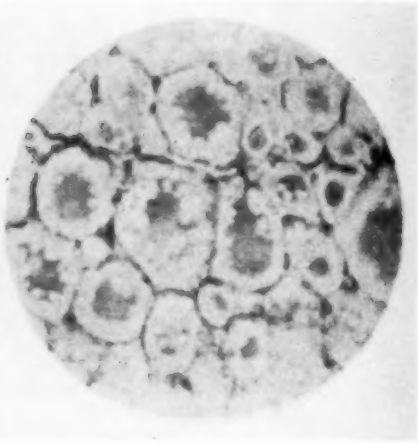


FIG. 7. Thyroid of a rabbit treated by Sakel's method, normal gland. Staining and magnification as in Fig. 6.

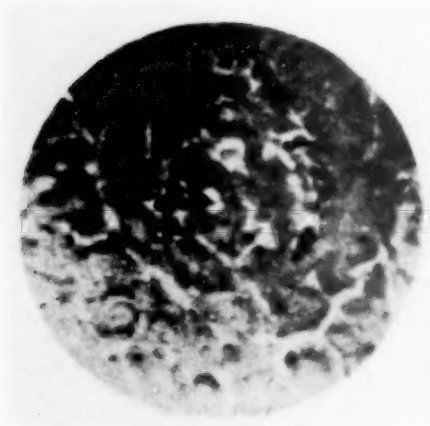


FIG. 8. Island of Langerhans from a normal rabbit: The A-cells (dark) are scarce. Author's methods. Magnified 342×.

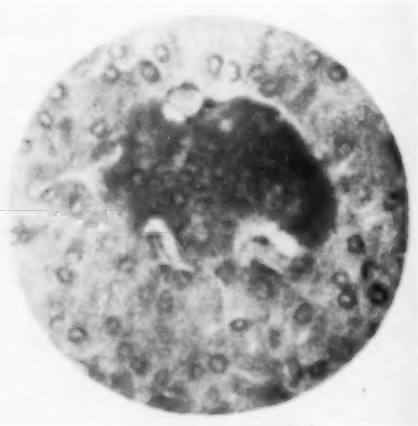


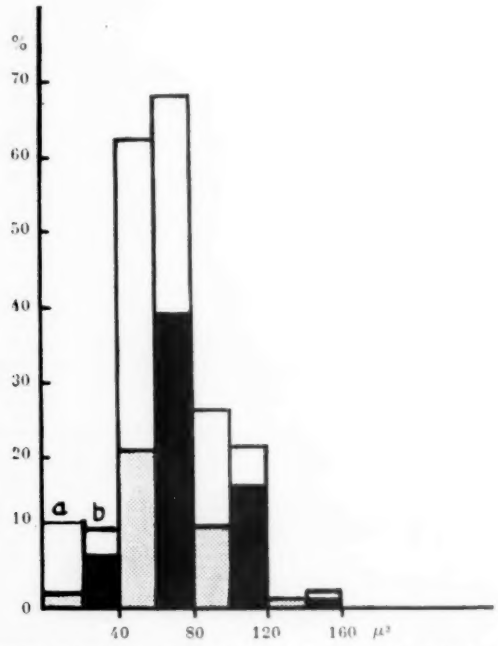
FIG. 9. Island of Langerhans from a rabbit treated by Sakel's method, almost entirely A-cells. Author's method. Magnified 560×.

Changes in the insular apparatus are, however, very interesting. They are, as would be expected, similar in the insulin and the Sakel animals. In my experiments also the size of the islands previously existent increased in comparison with those of the controls. As has already been said, new islands are formed. I have not been able to discover any reason for holding with Picard and Florentin that island cells arise from acinar cells. These authors assert that at the base of acinar cells a new nucleus springs up, invests itself with a cytoplasm of its own, and then passes out of the acinar cell on its basal side. Nevertheless I may express my accord with Hinteregger that the ratio between Bensley's types of island cells, A and B, which certainly represent different functional stages, is altered by insulin. The resting cells are greately decreased in number in comparison with those cells in full secretory activity. While we find in control animals a percentage ratio of A : B = 39.6 : 60.4, with the insulin and Sakel groups it is A : B = 62.7 : 37.3. It is a probability bordering on certainty that we are dealing here with stages of increased function as is evident from the greater insulin content of the pancreas found by Aubertin, Lacoste and Sarie in animals treated with insulin. The entire pancreas, and the islands in particular, can be seen to be very hyperemic and permeated with widely dilated capillaries. In the exocrine portion I was able to find in the fish, but not in mammals, an alteration in the form of the secretion. In the insulin and the Sakel groups the zymogen granules were much larger and rarer than in the controls. The change in the nuclear volume found in the other endocrine glands is also present in the island apparatus. The curve representing variations of the several size groups flattens out and becomes at the same time very little broader (figs. 8, 9 and 10).

Of the gonads, I have studied only the ovary and have found very few alterations that could be classified morphologically. I was able to confirm the very marked luteinization reported by the Roumanian authors already mentioned. I may add that there appears both in the stroma and in the corpus luteum a considerable increase in the average size of the nuclei with no difference between the insulin and the Sakel animals.

III

It follows from what has been said that with the help of histological methods certain changes may be demonstrated in the organs of nervous and metabolic regulation, after they have been exposed to the action of insulin and carefully studied, in animals subjected



Percentile changes in the ratio between α- and β-cells in the island cells in untreated animals and animals treated by Sakel's method, arranged according to the size of the nuclei in μ^2.
a: Controls.
b: Sakel animals.
White: β-cells.
Black: α-cells.

FIG. 10. Graphic representation of changes in the islands of Langerhans under the influence of insulin.

to Sakel's hypoglycemic therapy. These changes, however, do not attain either the quality or the intensity of those provoked by outright insulin poisoning and they are to be looked upon as essentially functional and therefore reversible. The greatest changes are seen in the islands of Langerhans, the adrenals, and the hypophysis. In the other portions of the endocrine system that were studied,

they may be regarded as morphologically insignificant. Of importance for the practicing physician are:

1. The therapy as it is conducted at present is not without consequences for the organism but in experienced hands it is accompanied by very little danger.

2. Late injury of any sort is hardly to be expected, especially as with long continuance of the treatment the morphological changes described sink more and more into the background and eventually are smoothed out altogether.

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20. THE RESULTS OBTAINED BY INSULIN THERAPY IN CERY FROM 1929 TO 1937

By H. STECK and H. BOVET [1]

As Mr. Flournoy remarked with so much frankness at the end of a session of the Swiss Psychiatric Society: "Speech is silver, silence is golden"—I am presenting gold: the film which my colleague Dr. Ott recently produced in the Psychiatric Clinic of Cery near Lausanne and which he is going to project is a silent film.

You will allow me, however, without accusing me of being a counterfeiter, to express here in behalf of some others, regret and homage:

A profound regret—that is, of not being at this instant seated among you so that I would be able to see at the place which I am occupying my revered teacher, Professor Hans Steck, detained far from here by illness.

And an homage—which accentuates my regret: an homage to this revered teacher who would have been happy to report here the fruits of his experiments which he has followed since 1929 in the field of treatment of psychoses by insulin hypoglycemia, experiments which he summarized at the meetings in St.-Urban in 1932 and in Rabat in 1933. Mr. Steck, if he were among us, undoubtedly with his modesty and great probity, would be the first to protest if we wished

[1] Asylum of Cery, Prilly-Lausanne.

to call him the father of the method which was brought forward so brilliantly by Sakel and his collaborators. But he would have missed a note in this chord of apotheosis of the insulin therapy—which does not mark, let us hope, an apogee—if the name of my revered teacher—with the name of Miss Klemperer (author of the treatment of Delerium Tremens with Insulin) which I know he would like to quote—had not been remembered here as the name of the veritable precursor.

21. RESULTS OF THE CONVULSION THERAPY IN THE PSYCHIATRIC CLINIC IN BERNE

O. BRINER [1]

In his brief publication about the convulsion therapy of schizophrenia introduced by him, L. v. Meduna was able to report results so favorable that we decided to use his treatment on the greater part of our patients at this clinic. Although our experience with the procedure is only of short duration, we can report very encouraging results. We have by this time treated 133 patients with cardiazol (actually with pentazol Hommel which is chemically identical with cardiazol). In part of them the treatment is not yet completed: it was interrupted prematurely for various reasons. It was carried through to the end with 111 patients who may be classified as follows:

Duration of illness.....	<1 year	1-5 years	>5 yrs.	Total
Schizophrenia simplex	4	1	0	5
Paranoia	2	3	5	10
Catatonia	23	10	29	62
Hebephrenia	4	6	19	29
Grafted Schizophrenia	1	3	1	5
	34	23	54	111

(This grouping follows the classifications of Kraepelin-Bleuler. v. Meduna uses the same terms with somewhat different meanings, so that unfortunately a direct comparison is impossible.)

In half the cases the duration of the illness exceeds five years. Such material is highly unfavorable for good therapeutic results,

[1] Psychiatric University Clinic, Waldau, Berne. Director: Professor Dr. Jacob Klaesi.

especially when we consider that most of the chronic cases were in a terminal stage of schizophrenia with great motor unrest and complete mental deterioration. This was no accident, for we purposely selected cases where all other therapeutic measures had failed entirely or caused only very transitory improvement. Also, we subjected to the convulsion therapy pre-eminently those acute cases in which no success was gained by other means. This fact must be kept in mind, for naturally it greatly lowers the successful results as shown in the statistics for acute cases. Very recently we have decided on the basis of our happy experience to introduce this method of treatment at once in selected acute cases with the aim of shortening the attack. We are convinced that the cardiazol therapy, like every other physico-chemical treatment for schizophrenia, such as insulin, sleep cures, etc., represents only a part of the therapy in this condition. It only enables us to establish rapport with the patient, in other words, it prepares the patient for the fruitful application of psychiatry. As Klaesi emphasized years ago, the true art of the physician who treats schizophrenia consists of tearing the patient away from his autism, demolishing the edifice of his delusions, and assisting him to establish connections with the social community. These tasks cannot be accomplished by chemical means only, and yet it is possible with the medicinal aids we have mentioned to bring hormonal influences to bear on or to remove anxiety or simply to shock the patients so intensely that those of them who are inaccessible to psychotherapy are freed from acute symptoms and can enter into personal contact with the physician. In our opinion the reason for the discordance in the results obtained in different places is the existence of prevailing concepts at each place, a point which has received too little attention in the past. Under the influence of growing therapeutic optimism and correspondingly improved measures, the results of treatment had already become better before the era of cardiazol and insulin, as earlier statistics indicated. Between 1933-1935 about 60% of the schizophrenic patients admitted to the Berne clinic with illnesses of less than a year's duration were discharged socially cured or greatly improved. Among these were a great many successful sleep cures. Later studies I have made show that at least $\frac{2}{3}$ of the discharged patients have remained able to work and for the most part showed no symptoms of schizophrenia. I do not wish

to contend that insulin and cardiazol are not indicated in acute cases. On the contrary many an attack is definitely aborted or first laid open to suggestion by the use of these drugs. Our collected results give the following picture:

Duration of illness.....	<1 year	1-5 yrs.	>5 yrs.
	%	%	%
Socially cured	17 (50)	3 (13)	3 (5)
Discharged with improvement....	3 (9)	0	2 (4)
Improved but not discharged.....	8 (24)	16 (65)	28 (52)
No change	6 (17)	5 (22)	21 (39)

(The concept of social cure corresponds practically with the term full remission commonly used in insulin therapy. One cannot expect, however, that a man who has had a shut-in schizoid existence all his life will give an impression of complete mental readjustment after the treatment. We speak therefore of social cure when the patient is able again to become a member of the community, shows no longer any symptoms, and subjectively and objectively is restored to his condition before the beginning of his illness.)

We saw the best results in general with catatonia, particularly that beginning in the fourth or fifth decade, colored with depressive hypochondriac and anxiety features. It is well-known that these forms are very hard to influence and have in general a poor prognosis. All 8 cases of this type that we were able to treat had full remissions after a few injections and could be discharged as social cures. Among them were patients that had been ill for more than a year and with whom sleep cures and other measures had failed. On the other hand our experiences have been very unpromising with those catatonics who showed complete lack of spontaneity and tendencies to mutism and negativism. Still, the material of which we can speak is very small, only 4 cases. All 4 remained for the whole period unaffected by the treatment. This is surprising, seeing that states of mild stupor in general respond very well to cardiazol, as v. Anygal and Gyarfas at the Budapest clinic have briefly reported. Furthermore we have had no great success with paranoid patients who have had more or less elaborate delusional systems lasting as long as a year, nor with Kraepelin's so-called paraphrenics, in contrast to our experience with paranoid patients who have predominantly hypochondriacal complaints and body hallucinations, whose response is especially good. Moreover the results are not encouraging with chronic hebephrenia and simplex forms although there are exceptions. For example, we were able to dis-

charge as cured one hebephrenic patient whose behavior had been childish and silly for a long time. Nor did we have much success with severe grafted schizophrenia. The most we could achieve was to quiet the patients to some extent. We are aware that in most of the cases of hospital improvement, we cannot expect that the improvement will be of long duration. In our experience, however, when a change for the worse appears only a few convulsions are needed to turn the tide.

In accordance with our past experience, therefore, we believe that the cardiazol therapy is indicated in the following cases:

1. Acute cases which show no tendency to rapid spontaneous recovery and which are not immediately accessible to psychotherapy.

2. Chronic cases with depressive-anxiety features sometimes complicated by hypochondriacal delusions and sometimes by pronounced hallucinations and stupor.

3. Chronic schizophrenic cases that show great motor restlessness or asocial behavior of a high degree and promise at least institutional improvement.

It will be a task for the near future to set up a more exact scheme of indications on the basis of wider experience.

In general we adhere to v. Meduna's directions with the exception that we leave shorter intervals between convulsions, provoking on an average three convulsions a week. The technique is very simple; it requires no specially trained personnel and does not make excessive demands on the physician's time. These are two distinct advantages it possesses over the insulin treatment. Besides, the course of treatment is generally not long. The injections are borne surprisingly well, even by feeble patients. Most of them could be up again after 1-2 hours, but we keep them in bed 4-6 hours after a convulsion. Often they complain of an oppressive feeling, exhaustion, and the like. Sometimes muscle cramps appear, predominantly in the back. We have also seen more serious complications: repeated dislocations of the mandible in predisposed patients, which were, however, easily reduced. Strangely enough, on two occasions we observed a fracture of the scapula in the lower lateral portion although the skeleton was otherwise apparently intact. On several occasions *arrhythmia perpetua* appeared. Unfortunately we must report exitus in two cases. In one of these

death occurred 4 hours after the fourth injection. The autopsy showed a deep seated stenosing struma besides bilateral hypernephroma from which the patient very likely would have died anyway within a short time. In the second case pulmonary embolism occurred, the night after the convulsion, following an old thrombophlebitis in the pelvic veins, which had given rise to no clinical symptoms. It is questionable whether the embolism would not have occurred even without cardiazol treatment. Von Meduna saw not one serious complication in more than 1000 convulsions. V. Angyal and Gyarfas had lethal exitus in one out of 45 cases, in a patient with aortic insufficiency. Still, these cases warn us to use the greatest caution. A careful physical examination before the treatment is essential. Hypertension is a contraindication, for the blood pressure in some circumstances may remain definitely elevated for a long time after a convulsion.

The most unpleasant aspect of this method of treatment is the fact that patients with few exceptions are negatively disposed toward the therapy and show more or less resistance, especially when, as eventually happens, only a minor convulsion is produced, with partial clouding of consciousness. It is a matter of medical tact and finesse to find the proper measures to quiet the patient under treatment. Generally we gain our end without a great struggle.

In judging the method, not only the quality of the remission but its duration as well must be considered. Since our experience extends back over only a few months, we can report no final impression on this point. We have already seen relapses, probably because in our early enthusiasm we discharged patients as soon as a full remission was attained. We have now become more cautious; following the advice of v. Meduna, we give 2 or 3 more "consolidating injections" after remission. Above all, we strive at this period to employ psychotherapy.

On the basis of our results we may say already, without departing from a sceptical conservative attitude that the convulsion therapy according to v. Meduna represents a definite advance in the treatment of schizophrenia. He who has lived at the bedside of patients and watched them, who before the treatment had been given up as utterly hopeless and were spending all their time between prolonged

tubs and the guard house, and now fully restored and transformed into men capable of enjoying life and doing their work, will no longer question the great value of the therapy.

22. EXPERIMENTAL RESEARCHES ON EPILEPTIC ATTACKS INDUCED BY THE ELECTRIC CURRENT

L. BINI [1]

Prominent among the recent methods of treating schizophrenia are those in which the action is based on violent and more or less transitory upsets of the normal functioning of the nervous system, with eclipse of consciousness. One of the most typical manifestations of such therapeutic methods and perhaps the most effective therapeutically is the epileptic attack. Since this type of therapy gives today the greatest hope of obtaining good results, it is logical that the efforts of physicians be concentrated on the search for new methods which would be better and better adapted to the desired end, either because the technique is simpler or because a given dosage produces an effect of constant intensity and duration, or because it is possible to foresee or avoid the dangers inherent in such methods of treatment.

Studies have therefore been made of the biological method of the insulin shock therapy, of the chemical method with cardiazol, and of the prolonged-sleep therapy. And recently Fiamberti has succeeded in producing epileptic seizures by injecting vaso-dilator substances into the cisterna magna by suboccipital puncture.

We have set ourselves the problem whether it is possible to introduce into this category of therapeutic methods some others based on physical effects, which should offer to some extent at least, the advantages mentioned above. This idea seemed to us *a priori* far from absurd.

Even at the end of the last century Blasius and Schweizer, Hermann and Matthias, then, in 1902 on the basis of more complete experiments, Leduc called attention to the possibility of provoking by means of the interrupted direct electric current great alterations in the functioning of the nervous system, which would be com-

[1] R. Clinic for nervous and mental diseases. Rome.

pletely reversible, such as narcoses and states of stupor. In 1903 Zimmermann and Dimier, later Battelli succeeded in producing characteristic epileptic attacks in animals by using an interrupted galvanic current. Thereafter numerous authors confirmed the possibility of obtaining at will, by varying the intensity and character of the current, the form of the electrodes, and their point of application: narcosis (Neergaard 1922, Zimmermann 1929), epileptic attacks (Battelli and Prévost 1907; Bikeles and Zbyzewski 1920; Viale 1929, Chiauzzi 1934), catatonic and cataleptic states (Kok and Sack 1931, Gentile 1933, v. Harreveld and Kok 1934, Gullotta 1934).

These experiments have so far been conducted almost exclusively on animals. We therefore wished, in our first attempts to solve the problems we have announced, to undertake experimental researches on the action of these physical methods and above all on the nature of possible alterations provoked by them in the nervous system.

We have so far employed exclusively the method of Viale, which consists of passing the street current (120 volts) for a very short time (1/15 to 1/20 second) through the entire body of the animal with one of two electrodes (carbons from a voltaic arc) in the mouth and the other in the rectum.

With this method we succeeded in producing constantly typical epileptic attacks in dogs. During the passage of the current the animal howls and has a violent tonic spasm with opisthotonus which lasts several seconds after the circuit is opened. Then there appear frequent and violent generalized tonic and clonic convulsions with foaming at the mouth, biting of the tongue, and incontinence of urine and feces. The duration of this second phase varies from 1-2 minutes. There follows a comatose state with complete muscular relaxation, absence of corneal and pupillary reflexes and sterterous breathing. In a short time the animal returns to its normal state, so that after a few minutes new seizures may be induced.

The alterations found by us in the nervous systems of these dogs were widespread and severe. Besides acute injury to the nerve cells of both reversible and irreversible types, there were especially in the deeper layers of the cerebral cortex alterations designated as "chronic cell disease" (marked retraction and hyperchromatosis of the cytoplasm and nucleus, staining of all the cell

processes for a great distance and tortuosity of these processes). Less serious, it seems to us, are the alterations of the glia and of the mesenchymal tissues.

Without entering into further particulars at present concerning our discoveries, we wish only to emphasize that with the method we have tried not only functional but also anatomical changes can be induced. On the other hand, the importance of the alterations we have met with so far in our animals does not permit us to exclude the possibility of applying these physical methods in human therapy. There are still many technical points to be worked out. Moreover we must keep in mind that in the insulin shock therapy, animals killed during the prolonged coma, that is under conditions analogous to those of the dogs we have examined, were found by many authors (and in our clinic too) to have very severe and irreversible alterations in the nervous system. These very alterations may be responsible for the favorable transformation of the morbid psychic picture of schizophrenia.

For this reason we feel that we are justified in continuing our experiments without abandoning the hope that they may lead to results directly or indirectly useful in pursuing the objectives we have set before ourselves.

23. CRITIQUE AND INDICATIONS OF TREATMENTS IN SCHIZOPHRENIA

By F. HUMBERT and A. FRIEDEMANN [1]

We are grateful to Sakel and von Meduna, not only for having given us their methods of treatment, but also for having provoked thereby discussions which open new horizons with regard to the mechanism of the cure of schizophrenia.

We do not mean to deny—the contrary is the truth—the existence of modifications due to the insulin coma, but we do not believe that the physical element is the only factor responsible for the change in the mental process; on the contrary, in our estimation, in all the recent therapeutic procedures, none of which pretends to have any causal therapeutic effect, psychological factors play a role; these factors, closely related to each other, constitute a common denomi-

[1] Asylum at Bellelay (Berne). Director: F. Humbert.

nator of the three methods which we use at Bellelay; namely, insulin, sleep treatment and cardiazol.

The psychological factors have been brought forward here especially by Sakel and von Meduna themselves, and the telling comparison of other methods (Sulfosine with or without psychotherapy) carried out in the clinic of Professor Claude in Paris as reported by Dr. Rubenovitch, support our conception.

So we are going to make a parallel study of some of the physical and psychological factors of these treatments. Let us begin with insulin, since it occupies the place of honor today. We have treated twenty cases and obtained improvements and remissions in eleven, of which six were socially cured; in one of these six cases there was a relapse which necessitated the readmission to the hospital six months after the completion of the insulin treatment. Moreover, we observed fair improvement in seven patients who became more sociable in the wards; in two patients the condition remained unchanged.

With regard to the technique, we do not allow the profound coma to last longer than two hours, we terminate it with glucose, giving from 250 to 1000 cc. of a 40% solution at a temperature of 45° which appeared to us to be the temperature most apt to combat the tendency to nausea. During one year and a half we had to resort only twice to the injection of adrenalin and to the intravenous injection of glucose. The amounts of insulin sufficient to provoke coma varied from 40 to 260 units; the treatments have lasted from nineteen days to four months and a half until a remission was obtained, or until there was no doubt of the failure of the treatment.

We are able to confirm that patients affected with paranoid schizophrenia and mixed catatonic states react most favorably to the treatment. For reasons which we shall bring out later, we have not treated cases in which the duration of illness was less than six months, but we also obtained favorable results in cases in which the illness was of more than two or three years' duration, and even in one case in which the duration of the illness was ten years, we obtained an improvement. In order to be able to judge the therapeutic result, one has to wait at least two months. One of the good remissions was, however, obtained by combination of the insulin treatment with the sleep treatment; the latter was ineffective before the use of the former.

What might be the hypothetical mechanisms of the cure? We have considered these mechanisms from two different aspects—namely, neurological and psychological. With regard to the neurological aspect, in spite of the optimism which leads us to continue the insulin therapy because of its very remarkable practical results, and no matter what the findings of the purely experimental histology might be, we do not believe that one can afford to neglect the work of Wohlwill who, since 1928, has described the diffuse alterations of the neurons, of the neuraxes and of the neuroglia following the death in the insulin coma.

In a very recent publication De Morsier has just brought forward a confirmation which is particularly significant because he deals with a lesion provoked by insulin without the preexistence of diabetes. Some authors consider that in the living being the cellular lesions are reversible, but from the standpoint of the organicist one might perhaps admit that it is just certain elective destructions which suppress the morbid manifestations and culminate in a recovery which in reality would be only the reestablishment of an equilibrium through loss of function.

In some patients who showed a good social recovery we had the impression that they appeared more euphoric, but at the same time somewhat more dull, passive and indifferent than they were before the onset of their illness. This impression of ours may find a parallel in what we see in spontaneous remissions with incomplete restoration of the mental functions; with insulin, however, the difference is more striking because of the shorter period of observation.

On the other hand, it is certain that insulin is a tonic of the endocrine functions as has been well known since long ago by internists and gynecologists. Notwithstanding the fatigue caused by the treatment, we see that the general condition of the patients improves almost without exception and often the weight increases in considerable proportion.

Let us now examine the subjective feelings of the patients and their psychology. More or less downcast according to their individual resistance in the afternoon which follows the coma, patients favorably influenced by the treatment are as though in a state of forgetfulness in the days between treatments. The patients say "I feel less tension in my head; the voices are less distinct; the movements are less forced; my face is free from tension." The

ideas of delusion are gradually expressed with less conviction, with a certain mechanical indifference; and more frequently than not they disappear, and at the same time there is amnesia also for all the incidents during the treatment.

Actual reactivations of the most acute phases of the psychosis seem to us to be infinitely more rare than infantile regressions in the sphere of verbal expressions and gestures, beginning with the most primitive ones, namely: thumb-sucking and frequent calling of "mamma" (even when hostile maternal complexes were present), then reaching out for support and behaving as if struggling for life, both in the state of torpidity and in the awakening.

The patients gradually feel more and more in a state of immobility, becoming stone-like. Their awakening, however, is often accompanied by severe agitation and by crying out, which first has the ear-marks of organicity, then becomes colored by distress or anxiety (which must remain in the sphere of the unconscious because of the fact that later on one is unable to get any explanation for these reactions). However, after the awakening, it is euphoria which predominates, even to a state of inebriation or of ecstasy.

What else could one say if not that the unconscious, which comes forward to the proximal margin of the lethal, appears to show a tendency to relegate to a secondary plane the morbid mechanisms, the neo-formations added to the normal psychology, in order to give a free hand only to the intense and continuous fight between the state of abolition of conscious sensations and the state of their return, which return is considered beneficial.

Isn't it in the final analysis a parent-process of that of the prolonged artificial sleep in which the essential factors, as shown particularly by Klaesi, are the elimination of the mental functioning, the weakness which forces the patient in the short moments of a half-awake state to resort to the help of others, to reach out for an effective contact which often is also a sign of infantile regression; then the patient is aware of his own submersion into forgetfulness with an ambivalent feeling partly of well-being and partly of feeling half-dead, which overwhelms him by an irresistible force, against which he fights, often very intensely. This fight of the vital reflexes against autism which in favorable cases is vanquished—isn't this fight very similar to that of the schizophrenic patient in a chronic

static condition who in the course of a grave intercurrent illness succeeds (in exceptional cases) in emerging from the condition of unreality to inquire with a great deal of emotion whether he has a chance to escape death, and remains in affective rapport as long as one can keep up the contact after the acute crisis is over?

The loss of consciousness in the sleep treatment, being less complete than in the insulin coma, has however the advantage—when the treatment is carefully done—of being sustained for a long time except for the short semi-waking periods which the patient does not recall. Taking into account the usual contra-indications we have no untoward effects in the treatment with somnifen; we give it in divided doses, a total of 5 c.c. in twenty-four hours, and in between small doses of morphine-scopolamin are given (from $\frac{1}{8}$ to $\frac{1}{4}$ of $\frac{1}{2}$ cg./mg. per dose up to a maximum, which is rarely reached, of 1 cg./mg. during six hours).

The sleep treatment, carried out as outlined, which we could prolong in an extreme case up to three weeks, is apt to lead to a remission more effectively and more rapidly than insulin, particularly in schizophrenic syndromes accompanied by states of delirium and anxiety or depression, but also in case of agitation or stereotypies which do not yield to re-education.

The prolonged sleep has great advantage over insulin in that it allows the sub-conscious mechanisms of self-healing or of amelioration by suggestion to do their work; this is sometimes evidenced by the fact that patients who appeared to be insensitive have crying spells and anxiety of a cathartic character, followed by amnesia. The sleep treatment is carried on up to a point when the affective tone in the semi-waking states permits us to foresee the relaxation of the mental disturbances which will take place in the ultimate complete waking state.

This relaxation and the calm are far from being the dominant phenomena in the course of the treatment with cardiazol, according to Meduna's method.

It requires perhaps a less prolonged physical effort on the part of the physicians and the nursing personnel than the insulin treatment, but it is a greater strain on our feelings. In the beginning of our studies, before we introduced the modification which we are going to describe, the procedure appeared to us to present also the disadvantage that the unconscious states could not be interrupted as

easily nor at as precise a phase as the unconscious state caused by insulin can be terminated. Moreover, the aura, while it is very brief, is, nevertheless, in most cases extremely painful to the patients; this is responsible for the patient's insistence to discontinue the injections. This requires from the physician more attention and consideration toward the patient than in the course of the insulin treatment, in order to maintain affective rapport.

From the standpoint of the technique it is, fortunately, not necessary, as Meduna believed, to leave the patients without sedatives in the intervals between the crises. Since we introduced this modification we have succeeded in attenuating, if not in suppressing entirely, the apprehension of prospective injections. Moreover, we learned to distrust the twilight states which either take the place of or succeed the epileptiform attacks. These states are painful to the patient and also dangerous by virtue of their tendencies to fugues and to brutal impulses. We counteract these phenomena by having the patient in bed for at least eight hours after the injection, and, before the injection, by sedatives such as chloral, morphine-scopolamin ($\frac{1}{4}$ to $\frac{1}{2}$ c.c. of the usual solution) or even luminal, without having to increase significantly the dose of cardiazol necessary to provoke an attack. These semi-conscious conditions have an unfavorable influence on the general course of the treatment; when the dose of cardiazol proves to be insufficient to provoke an epileptiform attack, we consider that it is best to provoke the attack by an additional dose of cardiazol administered immediately, either intravenously or intramuscularly. If the attacks recur, we terminate them by intramuscular injections of luminal; this seems to us to be a more physiological procedure than the ether-narcosis suggested by Meduna, which we never used. One practical inconvenience of the cardiazol treatment is, that if carried out for a long period, it has an effect of obliterating the veins.

Meduna makes the remark that he cannot understand the aversion of the patient toward a treatment, the beneficial effects of which he himself nevertheless appreciates. The analysis of the sensations of our patients makes it clear that their aversion is caused by an extreme fear of the aura, which is described, for instance, as "an electrical sensation," "an infernal chill," and—what is still more characteristic—as "sinking slowly into a hole," "into a well," "the anxiety of feeling oneself 'going.'"

Thus we can interpret these expressions as an anxiety-feeling of the evanescence of the conscious life, which obviously is infinitely more clearly perceived than in the beginning of the stupor caused by insulin and in the provoked sleep where we deal besides with the beneficial amnesia. Conversely, with cardiazol—aside from very few exceptions—the anxiety appears to have cumulative effects.

The falling into non-existence appears thus to evoke suddenly in the patient the primitive complex of the association of life-death, of which health-disease is only a diminutive counterpart. This violent appeal to the vital instinct which takes the upper hand over the autistic indifference, constitutes perhaps one of the physiological elements in the remissions due to cardiazol, but it is precisely because of the violence and—let us use the word—the brutality of these reactions that we refuse to propose this method of treatment to patients who are still capable of putting up a relatively good front.

The prototype of excellent remissions obtained solely by cardiazol was given to us by a patient who was violent, impulsive, dissociated, asocial, inaccessible to any effective rapport, extremely destructive and who, after several treatments with cardiazol, became lucid to such an extent that he described his changed condition as "a cloud removed from my brain." This patient left socially cured, he returned to his family, and to his work in the factory.

Another case which remained echolalic and impulsive after the insulin treatment left socially cured after the cardiazol treatment. In a total of thirty cases we had:

Two social cures with cardiazol only; two social cures with cardiazol following a slight amelioration with insulin; ten improvements (in chronic schizophrenics) with cardiazol only: five improvements with cardiazol and after a slight amelioration with insulin, and finally eleven cases with uncertain results because of too short a period of observation.

We also observed ameliorations in patients who were ill from five to ten years and even in an extreme case, with the combined treatment of insulin-cardiazol, we obtained an improvement comprising the restitution of the working capacity of a schizophrenic patient who was sick for sixteen years.

Neurologically the cardiazol attack is very close to the true epilepsy in its aura—which suggests the assumption of a vascular

attack in the region of the hippocampus and of the cornu of Ammon—and differs from it in the character of the contractions which follow the tonic phase and recall the Sherrington decerebrate rigidity.

Consequently, *a priori*, one cannot exclude the possibility that the convulsive action if repeated too frequently and for too long might affect the neurons in the same way as do the alternate ischemia and hyperemia of the true epilepsy; the same might occur in the insulin treatment. Meduna interprets the curative effect of the epileptoid crisis by cerebral excitations which counteract the structural or humoral modifications due to schizophrenia; in the insulin treatment one also attributes the remissions to neuro-vegetative modifications which would change the pathological neo-formations of the receptor systems.

This might be possible; we do not know. On the other hand, isn't it equally reasonable to see in the profound or repeated loss of consciousness of the patient, regardless of the mechanism producing it, at least one of the factors having a therapeutic effect on the morbid process? This might be accomplished not only by complete obliteration of the previously dominant perceptions and associations which would be in agreement with the general biological principle of putting the morbid process to rest, but it also might be due to the fact that the sinking into the unconscious state is accompanied by mental reactions of the most primitive, fundamental and powerful type, i. e., the fight of the vital instinct against the apprehension of the total loss of the normal mental function, and this instinct in favorable cases is evidently potent enough to vanquish this death-like condition that is the sickness.

That we are not dealing here with a theory, we can prove, particularly in using cardiazol when the aura is prolonged and shows a tendency to turn into a twilight state. On such occasions we heard our patients objecting violently to the anticipated attack and vainly exerting all their will-power to fight it off.

This sudden awakening of the life-death struggle manifesting itself strongly in spite of the apparently contradictory autistic indifference—this awakening, accompanied, as we formerly indicated, by infantilism, creating a new affective contact with the environment, seems thus to favor first a vivid antagonism, then a victory of reality over autism, a victory of the original equilibrium over the illness.

One deals here, indeed, with an artificial accentuation of the usual psychotherapy in schizophrenia when one tries by all accessible means to obtain the reintegration of the personality of the patient by demonstrating to him the advantage he will derive from the rational use of his affect and intelligence.

It is in directing this interest into the right channels that one achieves either a spontaneous remission or a remission inaugurated by the sleep or insulin or cardiazol treatment.

That is how we explain the improvement of our statistics of the favorable insulin treatments since our first recapitulation at the end of the last year. Certain partial remissions have actually favorably progressed; this was due to the fact that we utilized the first contact with the reality in trying to widen it by the usual psychotherapeutic procedures. These considerations are applicable, it goes without saying, only to schizophrenia where the presence of hereditary or constitutional degenerative processes does not exclude the possibility of supplementary phenomena stimulated by psychic mechanisms.

This is the more true because the cases of schizophrenia, most typically degenerative, correspond to the purest type of the classical dementia praecox—cases in which our psychotherapeutic influence is forcibly limited to superficial re-education appear to us to be also refractory or at least slightly responsive to the shock treatment either by insulin or by cardiazol.

Besides, it is worth noting that for practical reasons we inaugurated a year ago our studies in one half of our clinic and in the other half we had an almost equal number of patients whom we considered as prospective candidates for the shock treatments. Well, six months later we observed, as it was logically to be expected, an appreciable number of spontaneous remissions in the last-mentioned cases.

We therefore should be cautious in our conclusions regarding the percentage of cures obtained by drugs. We believe that we can have absolutely valid proof of the therapeutic effect of the shock therapy only in those patients who are observed at least for six months and do not show any evidence of a tendency to a spontaneous cure.

We conclude:

The curing by psychological methods wherever possible remains the ideal procedure, because it is better to guide the thinking processes than to deaden them.

If psychotherapy alone proves to be insufficient it is appropriate to resort to physiological procedures. The sleep treatment remains a therapeutic procedure which to us is more indispensable than insulin, particularly for schizophrenias accompanied by depression, anxiety or stereoptypies.

If the sleep treatment appears to be contra-indicated either for psychological or physical reasons, we gladly resort to insulin, especially for patients in paranoid or mixed catatonic states.

We do it, however, only after a certain period of observation, after we become aware of our inability to pierce the wall of autism behind which we feel an almost intact affect is hidden. Then it remains to resort to the shock treatments which sometimes appear to us to be comparable to an explosive which makes a breach but at the same time may produce damage so far not well-defined: this holds true particularly for cardiazol, whereas insulin, in addition to its effect on the psychosis, also has a distinct tonic effect on the general condition of the patients. Its action is less violent than that of cardiazol which we reserve for those cases which are not responsive to insulin, or when used alone and at the onset for those cases in which the autism is particularly well fixed. In spite of the restrictions and reservations which we advise as to its use, we obtained a favorable result in a patient whose illness was of seventeen years' duration.

In the mode of action of these artificially provoked shocks—certainly very valuable therapeutic means but in all appearance essentially symptomatic and experimental ones—we believe we are able to re-discover the psychological mechanisms which, being artificially accentuated, are common to the sleep treatment and to the natural processes of self cure; and we are tempted to attribute to them, if not an exclusive role, at least a very important role in the social remissions and cures which we have obtained.

24. THE TREATMENT OF SCHIZOPHRENIA BY PROLONGED SLEEP IN THE PSYCHIATRIC CLINIC IN BERNE

F. JENNY[1]

In 1920 Klaesi introduced prolonged narcosis into the treatment of schizophrenia. By this means, as is well known, he desired:

1. To arouse in the patient the feeling of a great need for help and a sense of weakness so that he would no longer behave toward the physician and the personnel in a negativistic manner; but would learn to accept and value them as indispensable, if not exactly welcome, helpers; thus the physician would reach a fruitful contact with them.

2. To influence the schizophrenic process by quieting the state of excitation through the long period of narcosis, and finally

3. Through general anesthesia and somnolence of a certain duration to disrupt the vicious circle between excitement, motor disturbances, ideas of movement, and again the following affect-disorders (excitement). Therefore the indications for prolonged narcosis are:

1. All degrees of negativism.
2. Anxiety States.
3. Hallucinations.
4. Stereotypies, apparently empty and meaningless behavior.

In choosing his cases and determining the prognosis Klaesi ignores, for the most part, the gravity of the schizophrenia. Instead, he pays attention to traits of the patient's personality and even expresses himself somewhat like this: "From our point of view he may be as crazy as he will, but he must have been a gentleman, must have a kind heart, and show a fundamental desire to make some contribution to the world."

The indications for the sleep treatment have heretofore remained in their essentials the same. On the one hand, there are excitements with restlessness and anxiety which present the picture of an acute hallucinatory condition; on the other, the phenomena of "isolation and encapsulation" with the consequent destruction of the patient's rapport with his fellow-men. Such cases promise little or no suc-

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cess; a part of the schizophrenic process has already become irreversible, i. e., an element of a demented state has already come into existence. Naturally the decision is often very hard to make. We shall not infrequently see a far-reaching improvement after the sleep-treatment even in patients who were treated only because it is always difficult and many times impossible deliberately to give up a patient as hopeless. Let me now speak in greater details of the contraindications.

In general all febrile processes are still considered as contraindications; all pathological conditions of the respiratory tract in all their manifold clinical forms from simple rhinitis and bronchitis to tuberculosis; diseases of the kidneys; severe febrile affections of the intestinal tract; and finally decompensated heart disease. A mild heart disease with compensation offers no contraindication. Skin lesions for the most part heal very well during the narcosis.

As clearly defined as the contraindications mentioned may seem, they correspond poorly to the present state of knowledge in the field of internal medicine. Even the assertion of Müller, in his work on prolonged narcosis with somnifen in 1925, that in his material we deal almost entirely with individuals shown to be physically sound by a previous careful examination, can hardly be held now in the light of our present knowledge; and perhaps not even in the light of the results of his own researches. We shall use as an illustration of the importance of a careful examination of the heart a patient whom we were treating with prolonged narcosis, which had to be terminated on the fourth day.

The patient was a 44-year-old woman. Examination showed very feeble heart sounds, and a systolic blood pressure of 140 mm. Hg. with a pulse pressure of only 35 mm. No murmurs were heard. The narcosis had to be terminated on the fourth day because of the appearance of outspoken symptoms of myocardial damage: frequent extra systoles, increasing pulse rate reaching 115, dyspnea and tachypnea, cyanosis, and a slight temperature rise on the second day after the interruption of the narcosis. Treatment with strophanthin, camphor preparations, and glucose led to recovery within three days.

We do not wish to deny that the myocardial damage was unfavorably influenced by somnifen. We only wish to emphasize the great importance of a careful examination of the heart. It seems

to us therefore indicated, as soon as there is any suspicion of myocardial damage, to perform careful tests of cardiac function; and, above all, to have an electrocardiogram made. Here we should like to repeat the principle stated by Krehl:

"Any discussion of the value or necessity of electrocardiographic study is altogether superfluous. It is a method of investigating the heart which can no longer be dispensed with. Not only does it extend and supplement other examinations, but it contributes entirely new information."

The circulatory disturbances described by Müller show almost the same picture as we saw in our patient. This syndrome: cyanosis, thready pulse, and very rapid respiration, is said to be typical of somnifen intoxication, but we must remember that this specific toxic state was induced by much larger doses of somnifen than our patient received. By the third day she was still getting 60 drops. Luminal and dial too may cause similar clinical pictures.

It would be very interesting to know how many of the patients described by Müller as having circulatory disturbances induced by somnifen had at the same time a myocardial lesion. We believe that this chief danger in somnifen narcosis would play a much less important role if a scrupulous examination of cardiac function were given the place it deserves. As Hediger and Klaesi pointed out, somnifen acts like all other hypnotics to produce a fall in systolic and diastolic blood pressure and a decrease in the pulse rate. If a myocardial lesion is already present it is easy to see that the heart may become less and less able to support the load placed upon it.

Müller endeavors also to ascribe to somnifen intoxication the pneumonias that appear during the sleep treatment with the drug. We concede that this is possible. When patients are given unusually large doses of somnifen, the resulting viscosity of the blood, according to Klaesi, may result in pneumonia. In isolated cases smaller doses may have the same result. Morawitz however does not venture to say that these are toxic pneumonias caused by somnifen. We believe rather that rapid shallow breathing may follow large doses of somnifen, with the result that the pulmonary tissue is insufficiently expanded, secretions are not expelled, and thus the conditions for a penumonia are fulfilled. The usual rapid and severe course is not surprising because in a state of narcosis the powers of defense of the organism are in abeyance. This is also the reason why we do not use prolonged narcosis in any febrile conditions.

Klaesi has valid reasons for recommending the interruption of a prolonged narcosis as soon as the temperature rises above 38° C. When an infectious process is detected at its beginning, and we interrupt the sleep at that moment, it becomes possible to make use of a rational therapy at the proper time; and we do not have to come in a few minutes before exitus to rescue the patient with an injection of camphor. Of such tactics Hösslin says: "the shot worked; the patient opened his eyes. The proper effect would have manifested itself after 5-6 hours if the patient had survived and had possessed a circulation to some degree adequate." We believe that the mortality would be much lower if we would institute rational therapy at the appearance of complications in the lungs while the temperature is still low. We must say, furthermore, that a therapy such as the sleep cure, as well as the insulin treatment, must be learned somewhere. In case such a method cannot be practiced according to the principles of its author, it may easily lead to misfortune. Among the 200 cases treated by narcosis in our clinic since 1933, there has not been a single death.

Of the 15 fatal cases in Müller's statistics, which constitute a mortality of 5%, he mentions 4 who already had diseases that were not diagnosed. This fact too shows how much we may expect from modern methods of studying function, and how many a disillusionment we may spare ourselves by utilizing them. Patients with severe interstitial nephritis, thromboses, and pneumonia are quite unfit for the sleep therapy.

Finally, Müller states that the prolonged sleep treatment, besides its danger, involves so many difficulties that the personnel is greatly burdened. Of this we have no doubt, but also we have no scruples on this point. The treatment of schizophrenia often consists largely of showing the patients how much interest is being taken in them, and we make the necessary effort to do so. This fact has been utilized by modern psychiatry, at least unconsciously. We need only recall the insulin therapy with its extensive preparation, and its procedures executed in grand style.

The relative importance of the resistance of the organism to the action of the drug used for inducing sleep in physically healthy patients is shown by the following case:

The patient was a 20-year old seminary student who entered our clinic February 28, 1937, in an acute catatonic state. The clini-

cal picture will not be further described. At the time of admission the patient's mother informed us that her son had been suffering from bronchitis for several days. The bronchitis was also clinically demonstrable. He had in addition several skin lesions which he had inflicted on himself in his excitement and which were already discharging a very purulent exudate. On March 2 we started the sleep treatment although the patient's temperature was 38.1° C., and his pulse rate 108, because we assumed at that time that the fever was largely of a catatonic nature and had no relation to the bronchitis. Nevertheless we rubbed his chest twice daily with a camphor ointment and in the intervals kept it wrapped. For his heart we gave digitalis and glucose. The result was that his temperature returned to normal on the third day, rose again to 38° C. on the fifth day and then fell to normal for the rest of the treatment. The bronchitis showed its first tendency to improve on the fifth day. From that time on it had no more influence on the course of the narcosis. The skin lesions were likewise healed. The schizophrenia episode was over 10 days after the completion of the prolonged sleep and the patient could be discharged as socially cured.

Serejski and Feldmann, in 1936, published a work in which they attributed to two factors the effectiveness of the sleep cure:

1. The latter constitutes a biological mode of attack.

2. In certain cases only, the idea of Klaesi that it exerts a psychotherapeutic effect is undoubtedly correct. If this were true, then we should expect that after the sleep cure a great number of patients would appear normal or at the most would feel only weak, helpless, and exhausted. The belief that the physician's work is over when the sleep is over, may explain why so many sleep cures fail. Actually, it is at the end of the period of sleep, when the technical activities are past, that the major task requiring the physician's special art comes to the front. He must then approach the patient with tact and discrimination at those points where a sound element of his personality remains, or where any tendency to spontaneous improvement can be detected and utilized. Of course there must be patients who at once seek contact and assistance of their own accord so that we need take no great trouble with them. Such patients are then erroneously regarded as cured by the biological mode of attack, the sleep cure.

Among the 20 case histories which we selected for this purpose from our recent records, we find not one instance in which the schizophrenic attack could be said to have ended with the end of the narcosis.

In all these cases, after breaking the vicious circle by narcosis, we endeavored to utilize to the utmost the resulting physical weakness and helplessness, and thus by way of psychotherapy to secure the necessary rapport and start a new course. With several patients we were unsuccessful after the first sleep cure and only after a second one did we secure a positive result. This was especially true of acute cases in which the excitement had lasted only a short time and the treatment was started soon after the onset of the illness.

In conclusion we should like to illustrate the changes that occur after a narcosis by the following two cases:

1. Martha S., born 1901. The patient is a woman who in 1929 had an acute catatonic illness which ended after four months. The present attack dates from the beginning of March this year (1937). The patient was very excited, heard voices, and had delusions to an unusual degree. With us her behavior was altogether negativistic. She refused food because she believed it was poisoned. Everything we said to her she answered by crawling under the covers like a sulky child. One month later, when she was quieter but still very negativistic, we started the prolonged narcosis which ran its course without any complications and was terminated after 10 days. In spite of the relatively large quantities of drugs we gave her, she slept for the most part only very lightly and toward the end was quite restless. Even after the termination of the narcosis her state was such that her sister suggested to the physician that he ought to put her in a guard room for agitated patients. The first attempt to talk with her led to no success. She was not exactly negativistic but was so indifferent that she gave everyone the impression that the sleep had failed completely. Nevertheless on the following day we resumed our interview and told her that her childish behavior did not meet with our approval, and that if she were going to keep on playing this role we should have to transfer her to the children's ward. She then began suddenly to talk, became very dependent, and on the following day was able to go for a walk with her nurse, with whom she conversed very little, in broken sentences, and still in an apparently confused manner. But her condition improved

from day to day so that she could be discharged five days later. At the time of her discharge she was still suffering from a rather marked insomnia, felt weak, and heard occasional voices, which apparently no longer disturbed her. She also explained that she knew fairly well what had taken place before and after the narcosis. She could even remember what her sister had said, namely, that she was as agitated as before the narcosis. She knew too the doctor's answer that that it was best to have patience with her, for in that way she would get well. She had then gained confidence and from that time on had trusted the doctor and told him all that distressed her.

2. Haro B., born 1916. This young seminary student was brought to us January 30 in a severe state of excitement. He had been ill at home for some time. He could not sleep, but spent whole nights looking out of the window in a catatonic pose, regarded himself as an ascetic and for this reason declined to go back to school or to eat anything. He comes from a family tainted with schizophrenia on the mother's side. His mother is definitely autistic, with scattering and distinct ambivalence. At our clinic the patient showed at first a pronounced catatonic condition. He stood on his bed like a saint with his hands outstretched and his head bent backward. In addition he had delusions and, as he admitted later, frequently heard voices. A sleep treatment lasting from February 2 to 9 led to the result that the patient immediately on awakening tried again to assume his original catatonic pose; he was, however, far too weak, so that he fainted with each attempt. On the third day the state of affairs gradually improved. Again and again he asked for his sister or the doctor, and wanted someone to sit and talk with him. He could say very little himself, but in spite of his scattering he took the trouble to express himself clearly in reply to our questions. He could tell us his earlier condition very well. He knew how he had been brought to the hospital tied, and what took place before the sleep treatment. Then he had a sensation that he was making a long journey on which he at first suffered great anguish, but later his trip was more pleasant, and as he recovered his breath, he was refreshed. On awakening, he said, it became clear to him where he was, and he was afraid he would fall back into his former state of darkness. This was the reason why he kept calling his sister. He felt she could probably help him. In the fol-

lowing days the patient grew constantly more accessible. His scattering faded away before our eyes. On February 15 an association test was carried out with normal results and he was finally discharged on February 19th. A talk with him a few days ago disclosed that he felt absolutely well, and it would now be impossible to make a diagnosis of schizophrenia in his case.

From the two cases cited it appears very clear that the improvement came about only several days after the patients awoke. In the second case this improvement probably would have taken place without our efforts since the quest for contact was coming from the patient himself. With the first patient, on the other hand, there was grave danger that she would have relapsed into her former isolation if everything had not been done to rescue her from her morbid condition.

25. ON THE PHYSICAL TREATMENT OF SCHIZOPHRENIA IN THE PSYCHIATRIC CLINIC IN BERNE

F. JENNY[1]

In his work on the treatment of schizophrenia in 1922 Klaesi brought forward the thesis that schizophrenic patients in whom the acute cerebral process has run its course, but who cannot find their way back into active life, may often be treated with great success. He differentiates several types of schizophrenia and a corresponding number of methods of treatment concerning which I shall not go into details here. I wish to mention only those groups that are of importance in connection with physical treatment.

1. Patients with insight into their disease and a desire for treatment, who require methods that go as deep as possible and carry the utmost conviction. It is important that the methods chosen be very impressive and—in Klaesi's words—be amenable to therapeutic formulae that are intelligible to the general public.

2. Hysteriform cases suffering from compulsions, with whom not only explicit questioning but also simple methods of suggestion are indicated.

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That is one of the spurs that drove us in our quest for a physical treatment of schizophrenia. The other spur is Klaesi's hypothesis that in every therapeutic undertaking against schizophrenia, and in great probability in the insulin treatment too, the external equipment, the great why and wherefore, the intensive effort on the part of the physician and personnel to establish contact, and the most zealous pains in attending and caring for the patient play a deciding role. If someone would treat selected cases with as great effort, and let the patients see and feel this effort, and with as penetrating sympathy, but omit the insulin or any other drug, he might meet with some agreeable surprises. I am very glad to be the one whose lot it was to test these conjectures for their factual content and to bring out proofs for the hypotheses.

The procedure in brief is as follows: 3 Sisters put the patient into the physician's hands wrapped from head to foot in a pack at body temperature. The entire task is performed as carefully as possible, and with great attention to the patient so that he gains the impression at once that we want to help him at any price, let it cost what it will. We left our patients for two hours in this pack and used the time to converse with them. What came of these proceedings we should like to illustrate by 3 cases:

1. Mina J., born 1891, a schizophrenic patient who has been an inmate of our institution since 1933. In the first six months of her stay with us, she talked a great deal, for the most part in an unintelligible and scattering fashion. Nevertheless she was a kindly person and enjoyed work. In May 1936 she broke out into an acute catatonic attack with marked manic features. She babbled day and night; her words were disconnected and scarcely intelligible; she cried and quarreled with her nurses. After a sleep treatment with somnifen at first she behaved as badly as before, but after a few days became more accessible. In September 1936, her condition grew worse so that a second sleep treatment was carried out. This one too led to slight improvement which did not last. It is noteworthy that during the entire period she complained of bodily illness which was never accompanied by objectively demonstrable organic changes except for a severe polyneuritis of both legs in the autumn of 1936 which led to extensive secondary muscular atrophy. For these bodily ailments she always wanted treatment, even when they amounted only to a mild constipation. Inasmuch as little obvi-

ous attention was paid to these ailments, she readily reverted to her earlier pathological condition.

On April 29, 1937, we took the patient under our care and wrapped her in a pack for 2 hours daily over a period of 14 days. At first she was altogether indifferent to this new treatment, but even on the second day she was beginning to be pleased with it, and tried to walk although she had lain motionless in bed for more than half a year. Thence forward she grew more and more accessible and agreeable, whereas her former nurses had characterized her as hateful, mean, and intolerable. After the fourth treatment with the pack she walked upstairs without the help of the Sisters. After that she was up the whole afternoon and helped in the guardroom, although walking gave her great trouble and no little pain because of the exertion required as a result of the persisting neuritis with consequent muscular atrophy in both legs. The mental state of the patient, however, is now so good that she can be discharged and we have already taken the necessary steps.

2. Margrit G., born 1883. The patient has had since 1933 a schizophrenic condition running a chronic course which, however, on cursory examination is almost overshadowed by hysterical symptoms of extreme degree. Actually it was always these symptoms that her doctors treated, while the loss of contact due to the schizophrenia and the consequent search for a means of regaining contact kept her going to doctors. To her the doctor was the only person from whom she could obtain assistance and when she made use of the hysterical symptoms it was in the hope that she might in this way interest the doctor most easily and attach him to herself. The doctors attempted to treat her tremors, twitchings, headaches, giddiness, insomnia, palpitation, and nausea with medicines and on one occasion with surgery, but not once with psychiatry. They had not the slightest success. Recently she began to hear voices. Her condition finally became such that she could no longer be tolerated outside an institution, because of her low intelligence, obstinacy and querulous importunity.

On admission to our clinic she was for the first few days very excited, cried, wailed and could not be persuaded to get up and do any kind of work. Even after transfer to the guardroom for troublesome patients and after energetic correction, nothing was accomplished. On May 5 we began using our Priessnitz compresses.

During the first treatment she remained still, but at the end of it complained of headache. On the second day she stated that she would enjoy spending the whole day in the pack and that she was already suffering less from giddiness. She added that after a long conversation with the doctor it had become clear to her that the voices she had heard overheard were not real voices but "hallucinations." Later she said she was no longer able to listen to these voices and for this reason she was much more tranquil. After the 10th treatment the remaining hysterical symptoms passed away as did the sense of weakness, the pains in the back and legs, the headaches, and also the insomnia. During the last treatment she told the Sister in charge all sorts of happy incidents from her youth. She felt very much obliged to the doctor and the Sisters for the treatment they gave her.

With the end of the treatment our work is not yet finished. We must then give thought above all to the question, "What is to happen to these patients?" We must show them the way out into life and make it smooth for them. We learned the great importance of these measures in a case of schizophrenia with hysterical paralysis of the right arm. At first we obtained a great improvement but when we told the patient that she could soon go home she explained the next day that she would rather not have any more pack treatments, because she certainly could not be cured. In other words, she liked it in our clinic so much, unfortunately, that she would rather stay here than go out and grapple with the difficulties of practical life, which in her case were not insignificant. Of course we shall not go into the details here, but our plan is to give her further treatment.

It is not our desire to discuss any more cases like these. From what has been said already it is clear enough that the indications for treatment of this kind are quite limited but capable of fairly exact definition. They concern schizophrenic patients with hysterical symptoms, marked impulse to attract notice and a desire to be treated; patients forced into withdrawal by disillusionment over lack of contact, and, finally, patients with insight into their illness.

We have attempted to apply our method also to acutely excited schizophrenic patients. We obtained in every case a certain calming effect while the patient was in the pack; in a few cases the result

was even somewhat better. With these few it was possible to attain a transient but quite good affective rapport which was attained at no other time before or after the treatment. Certainly this was no great therapeutic success. But its value in the investigation and understanding of the clinical picture and in the use of any future method of therapy should not be underestimated.

In conclusion, one remark more: we do not think that our Priessnitz compresses are interchangeable with the complete pack which has been used in psychiatry for a long time. We believe that the difference is not only great but also so fundamental, that it must be taken seriously and the method applied with the greatest care. Not that we should wish to insist that it is necessary to follow particular courses to learn the correct application of the procedure, but only that those who use the method be aware every moment of the essence of it, that they should bear in mind that much depends on the care, interest, affection, and, generally speaking, on the whole attitude towards the patient which, so to speak, must touch his heart and thus bring him closer to the physician and medical personnel.

26. THE "DIACEPHALORACHIDIAN" THERAPY

GAETANO BOSCHI [1]

The greater part of the articles pertaining to this therapy have appeared in the following publications: "Atti della Società Medico Chirurgica di Padova," "Atti dell' Accademia delle Scienze Mediche e Naturali di Ferrara," "Giornale di Psichiatria e di Neuropatologia," "Revue Neurologique," and "Journal Belge de Neurologie."

Under the term "diacephalorachidian therapy" I include the entire group of methods founded on the concepts of "diffuse production of cerebrospinal fluid" and "neuro-meningeal drainage." The two concepts are related as shown by my various publications and those of my co-workers.

It is not surprising that with simple lumbar puncture we diminish intracranial pressure directly. But to activate the diffuse production of the cerebrospinal fluid and thus increase the neuro-meningeal drainage so as to wash away from the nerve tissue the toxins that

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are corrupting it is a wonderful achievement. Accordingly we see more numerous and diverse therapeutic indications for lumbar punctures than were justified on the basis of the old ideas.

But experience teaches us that in the majority of nervous diseases lumbar puncture is an inadequate therapeutic measure. It calls forth an activation of the production of the cerebrospinal fluid, an attack of sterile meningitis, and perhaps a slight conditioned relaxation of the barrier between the blood and the nervous system. We conceived the idea of finding ways of provoking these same physiopathological effects for therapeutic purposes, only in a more energetic form. Also we conceived the idea of provoking a relaxation of the barrier between the blood and the nervous system. Such a relaxatior of the barrier, by allowing the blood a more liberal access to the nervous centers, may permit a probable autovaccination effect. At least it would have the advantage of opening a path to the nervous centers for substances which may serve therapeutic ends in many ways.

Obviously there are various possible types of diacephalorachidian therapy, of greater or less complexity. The more complex types are suited to diseases in which there is a very noxious etiological agent to combat and in which profound defense reactions of great intensity must be set in motion. Such, for example, are cases of multiple sclerosis and amyotrophic lateral sclerosis.

This treatment is apt to be of considerable value in diseases previously resistant to treatment or furnishing indications for destructive surgical intervention, as has been noted in various publications.

With regard to multiple sclerosis, after my first case, which was presented to the Medico-Chirurgical Society of Padua in February 1934 and still remains cured after nearly 4 years, Bonazzi and Rizzo, Tanfani, and Roncati have described instances of cure or great improvement. Beneficial results in amyotrophic lateral sclerosis were published by Ayres and Cortes de Barros, by Roncati and by me; in Huntington's chorea by me in collaboration with Telatin. Cures of trigeminal neuralgia of more or less long standing were reported by Campailla. He also reported appreciable results in various motor disturbances. Bonazzi and Rizzo described the cure, now a year old, of a severe encephalitic blepharospasm which began 6 years ago. Complete rheumatic paralyses of the facial nerve with degenerative reaction have been seen to resolve almost completely

in a fortnight. Very impressive results were obtained with stubborn chronic arthritis especially in the large joints, with X-ray findings of arthritis deformans, but without conspicuous external morphological deformity of the parts. Works on this subject are in preparation, one by me and one by Loewald.

As to the technical procedure I refer to other articles of mine for several ways of carrying out the treatment, especially to Revue Neurologique 1935 II, 6, for an account of the more complex procedure adapted to toxi-infective diseases such as multiple sclerosis.

The more current technique, and the one to be employed especially for example, in trigeminal neuralgia, in chronic arthritis, and in certain psychoses is essentially the following:

There are withdrawn from the patient by lumbar or cisternal puncture about 10 cc. of cerebrospinal fluid. Through the same needle is injected 1 cc. of a 5% solution of chemically pure phenolsulphonthalein (i. e., 5 mg. of the dry substance). The solution should be rendered slightly alkaline with bicarbonate of soda. If the patient is in good physical condition, it is wise to aspirate into the syringe containing the phenolsulphonthalein another cc. of double-distilled water. According to our experience more intense reactions and more effective therapeutic response are obtained with this greater quantity of liquid and with the more dilute solution. Six or seven hours after the intraspinal injection of the phenolsulphonthalein solution about 5 cc. of the cerebrospinal fluid previously extracted are injected into the gluteus muscle. Researches of my assistants Dr. Barison and Dr. Telatin tend to show us that this is the most favorable time (opening of the barrier). The patient is then kept in bed 6-7 days. The febrile reaction, sometimes above 39° C, lasts sometimes an hour, sometimes a day. There is often sensory and motor paralysis of the lower limbs which disappears completely after a few hours. Rarely there is a slight retention of the urine lasting for a few days.

For the most part we apply the treatment only once. On only one occasion I had the fortune to observe a cure, or almost a cure, following a second treatment, in a case of old stubborn arthritis of the elbow in which the first attempt had not met with success.

And in the treatment of psychoses, what success is the diacephalorachidian therapy able to show?

As regards schizophrenia the bibliographical data are discordant. Cabitto was able to obtain very favorable results, while Galli's were only negligible. In 2 or 3 early cases I saw psychic reorganization in one day and in a few weeks respectively.

But we have received with favor and have already applied the method of Sakel which in my institute already seems to promise good results. Likewise we have begun to use the method of Meduna. One study has already gone forth from my institute, the work of Dr. Campailla, which deals only with the diagnostic import of cardiazol injections.

More dependable and unquestionably more remarkable than the results in schizophrenia are those secured by means of the diacephalorachidian treatment in various other psychoses and neuroses. We hold the opinion that often it is best in such cases to carry out treatment with various drugs, specific or pyretogenic. We are convinced that in isolated cases such pharmacological methods employed after the diacephalorachidian treatment may yield better results than they could have done alone.

Montemezzo and Telatin have published 11 favorable results out of 20 patients treated alone by the diacephalorachidian therapy. They were concerned for the most part with states of confusion of various sorts, some of them of encephalitic origin, and with twilight states. The rapidity of the cure bore witness to the resolving influence of the treatment. They reported at the recent meeting of the Italian Psychiatric Association 30 additional cures. To these I added other notable results of my own in a great variety of psychic disorders, and Dr. Giacomo of Syracuse added his observation of good results in twilight states which suddenly disappeared with the diacephalorachidian therapy.

27. THE INSULIN TOLERANCE IN EPILEPSY

A. ZOLLIKER [1]

The metabolism of sugar in epilepsy was thoroughly tested in the following way:

The fasting blood sugar was determined, and in most cases, was found to be normal, but occasionally slightly high or low. For the

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abnormalities a dysfunction, particularly an endocrine anomaly, was assumed to be responsible. In addition, various authors have determined the blood sugar before and after the seizure and found preparoxysmal hypoglycemia and postparoxysmal hyperglycemia.

The glucose tolerance test furnished no uniform results. There were some cases with lowered, some with normal, and, about one-fourth of the number with heightened tolerance.

The tolerance test for adrenalin also showed no uniformity.

The test for the renal threshold for sugar led to no significant results.

The sugar content of the cerebrospinal fluid was found to be high, normal, and low. During the seizure itself it is said to be lowered and in the status epilepticus to be sometimes almost zero and sometimes increased. The sugar tolerance curve for the cerebrospinal fluid was not at all pathognomonic.

So far as I know, only one study on the use of insulin in epilepsy has been made, that by Baudouin, Azérat and Lewin in Paris, in 1933. They injected intravenously 10 units of insulin into each of 17 patients and made 19 blood sugar curves, taking blood at intervals of $\frac{1}{2}$, 1, $1\frac{1}{2}$, and 2 hours. The fasting blood sugar was found to be normal in 16 of the patients, subnormal (62 mg.%) in one. The hypoglycemic values corresponded to normal findings. The 16 patients had definite, but not menacing, signs of hypoglycemia; in no case was there a seizure.

In undertaking to test the insulin tolerance in epilepsy, I was aware that my procedure demanded special caution. On the one hand, except for the one work mentioned, there was no past experience with the effects of insulin in epilepsy, and on the other, I was warned by different people against the undertaking of such researches as too dangerous.

Therefore in the preliminary study I gave doses of 5, then 10, 15, 20 and 30 units of insulin intramuscularly. Since no clinical symptoms followed (that is, with the largest dose there were some slight hypoglycemic symptoms), and the dreaded seizures were absent, I dared to carry out phase I of Sakel's insulin shock therapy, in the first 8 cases only through the first step, and in the 18 later ones to the very conclusion, that is, to the appearance of a deep shock. In individual cases shock was induced as many as 6 times.

So I am making the following report on 26 epileptic patients—14 men and 12 women—who underwent the complete insulin shock therapy and were during the period of the investigation under otherwise unchanged therapeutic conditions. The initial dose (for individual values see table II) was 20 to 30 units of insulin, the daily increase 10 units.

With 8 of the men the shock dose was: 2 x 80, 2 x 90, 100, 110, 140, 220, an average dose of 110 units. In the other 6 men, after doses of 70, 100, 120, 140, 150 and 220, there was no shock. In these 6 cases then, the shock dose was over 133 units, on the average.

For 10 of the women the shock dose was: 30, 90, 2 x 100, 120, 3 x 140, 150, 160, an average of 117 units. In 2 other women there was no shock after 60 units.

In comparison, the shock dose for our schizophrenic patients was as follows: 5 men required 100 to 160 units, an average of 135 units of insulin.

18 women required 20 to 168 units, an average of 106 units of insulin.

In the epileptic patients observed, clinical symptoms of hypoglycemia appeared after widely varying doses and quite independently of the varying blood sugar values, as has already been observed by different authors with respect to schizophrenic patients.

Most of them soon became sleepy, then definitely stuporous: then there appeared mild to severe myoclonic twitchings and symptoms of tetany, flushing, pallor, or slight cyanosis of the skin and mucous membranes, and in most cases perspiration.

We induced altogether 30 shocks in 8 men and 40 shocks in 8 women.

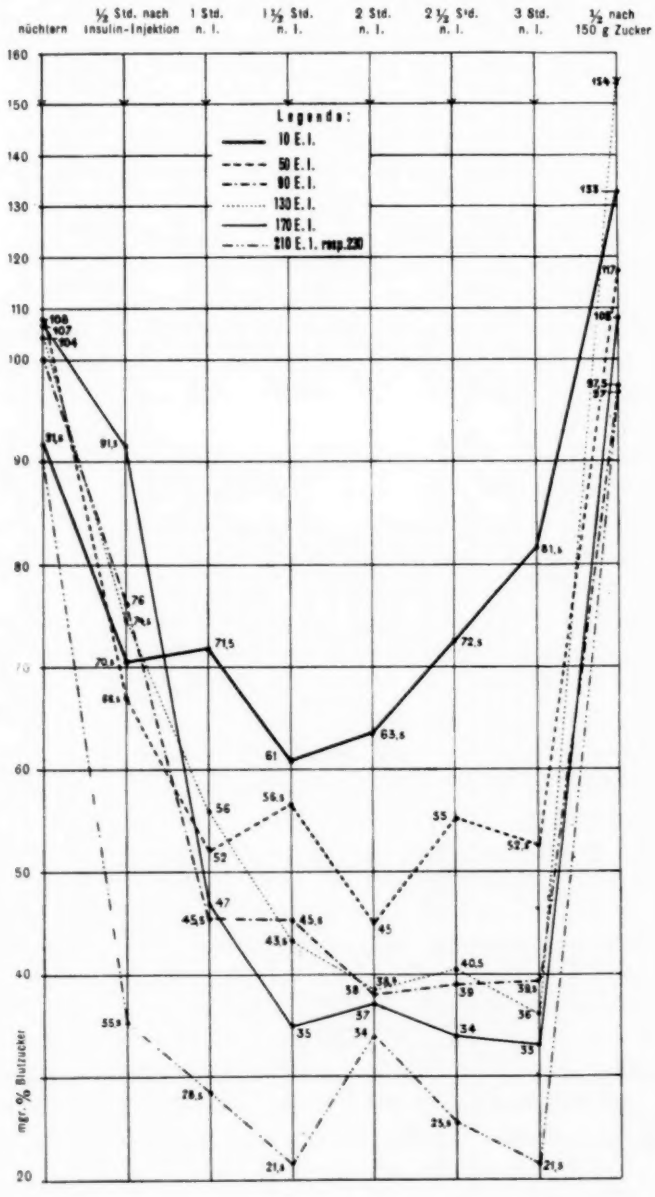
In one patient, instead, of the 4th moist shock after 120 units of insulin, there was an epileptic seizure (Phase 2). In 2 of the women, after 120 and 140 units respectively, there occurred epileptic seizures in Phase 1. Thus out of 70 moist shocks we had 3 seizures = 3%.

By way of comparison we offer the following data on epileptic seizures in the schizophrenic patients:

14	with	altogether	354	shocks	and	no	seizure
6	"	"	157	"	"	1	"
2	"	"	92	"	"	3	seizures
1	"	"	20	"	"	10	"

TABLE 1.

BLOOD SUGAR CURVES IN SCHIZOPHRENIC PATIENTS.
After injection of 10, 50, 90, 130, 170, 230 units of insulin (21 studies).



The last case, U., is especially interesting. He is exceptional in another respect too. The very great tendency to seizures may be traced to the fact that his father has epilepsy. We have here among the schizophrenia patients 600 shocks with 22 seizures, or 3.5%. If we omit U. then we have 12 seizures or 2%. Only 2 of these seizures were in Phase 1 (20, 25 units); most of them occurred in Phase 2 (with 65, 70, 85, 3 x 125, 4 x 140, 150), seldom in Phase 4 (30 units and case U. with 35, 30, 20, 3 x 15, 12, and 10 units).

The following somatic observations were made in the epileptic cases:

1. The pulse rate increased with insulin as has already been noted in the insulin treatment of schizophrenia.

2. The temperature fell in analogy to the findings in schizophrenia treatment. Twice after the administration of insulin there was a hyperpyrexia in the course of the evening, which after a day's rest disappeared spontaneously and for which an infectious origin could be discarded.

3. The effect on body weight was astonishing. The epileptic patients gained from 1 to 6.5 kg., an average of 3.5 kg. during the period of the insulin treatment. In comparison our schizophrenic patients showed an increase in weight amounting on the average to 3.85 kg. in 46 days—in the case of U. 17 kg. in 56 days.

4. As for perspiration, it is noteworthy that only 17 epileptic patients perspired to any degree, 9 scarcely at all or just perceptibly. On the contrary all the schizophrenic patients perspired profusely.

5. No exact neurological investigations were made.

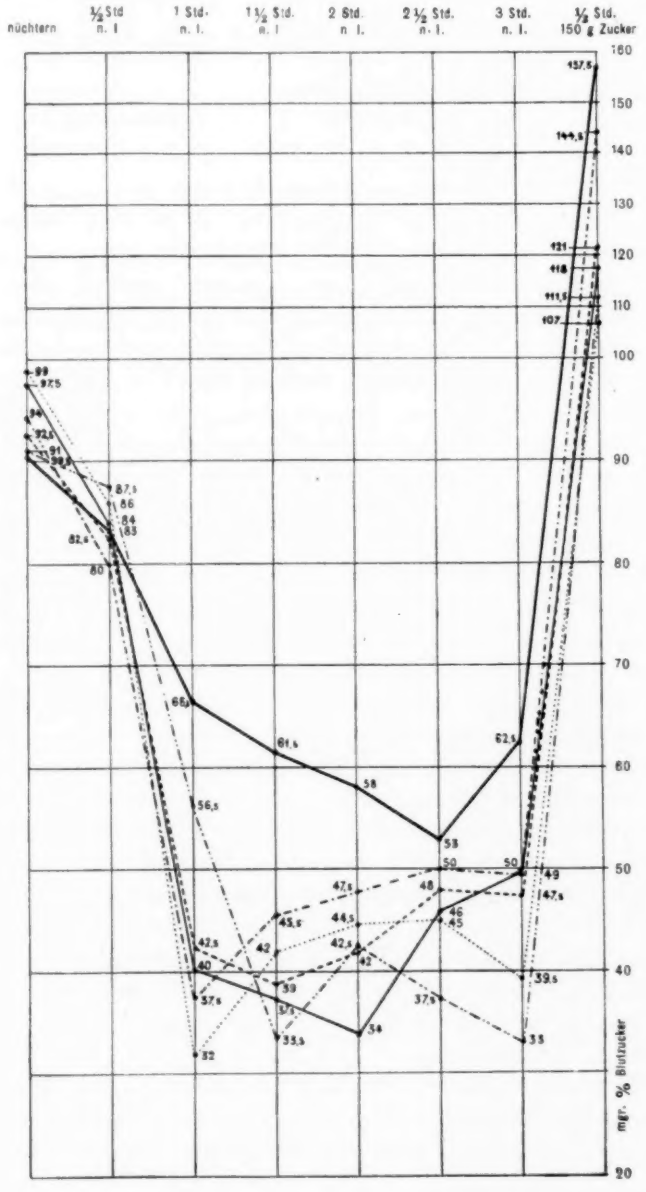
6. The fasting blood sugar ranged between 77 and 131 mg.% with most of the patients showing 100 mg.%.

7. 64 blood sugar determinations were plotted on the curve during the insulin study, always made in fasting state, ½, 1, 1½, 2, 2½ and 3 hours after the injection of the insulin and ½ hour after the sugar intake (see table 2). For comparison we plotted 49 sugar determinations, made at similar intervals, on a curve for the 21 schizophrenic patients (see table 1). It is absolutely clear from these curves that there is no direct relation between the clinical manifestations and the level of the blood sugar. However, with increasing amounts of insulin, the blood sugar curve falls consistently, and remains low for a longer time after larger doses of insulin. In all cases the rise is fairly immediate. There is, there-

TABLE 2

BLOOD SUGAR CURVES IN EPILEPTIC PATIENTS.

After injection of 10, 50, 90, 130, 170, 210 units of insulin (19 studies).



fore, a certain connection between the size of the dose of insulin and the blood sugar curve. If one compares the curve for the epileptic patients with that of the schizophrenic patients one sees that in the first half hour the fall in the epileptic curve is quite protracted. After that, on the other hand, the blood sugar falls faster in epilepsy and in the course of the curve there is no such intermediate peak as one sees in the schizophrenia curve.

The blood sugar determinations were made according to the Hagedorn-Jensen method.

The epileptic patients very quickly fell into a deep sleep. When they awoke they were fairly often tortured by very distressing hunger and thirst, and in a given time consumed enormous quantities of bread and tea. Individual cases were euphoric after the shock. In 5 cases there were psychic changes during the effects of the insulin. 2 of the women experienced phases of excitement in which they were rather confused, showing logorrhea and motor restlessness. One of the men showed great motor restlessness and perseveration in making the same wailing lament: in fact, his excitement was definitely hysteriform with a hypomanic coloring. Another man showed a paranoid reaction, was disoriented as to place, had anxiety over fear of being murdered, and threatened his neighbors with aggressive acts. All these phenomena disappeared immediately after sugar was given. Subjectively the patients did not consider the treatment unpleasant and at most felt that the profuse sweating and the hunger were somewhat fatiguing.

We were particularly interested in finding out whether this insulin treatment had any effect on the frequency of the seizures. As we have already said, 3 epileptic seizures took place under the direct influence of insulin. This small number of 3 seizures with 291 injections of insulin shows without any doubt that the value of insulin in provoking seizures is slight (of course with the provision that the patients are under the influence of a sedative). I should like to credit to that the explanation of the fact that no seizures occurred in spite of a fall in blood sugar as low as 18 mg.%.

During the course of the insulin treatment, but outside the actual insulinization, the frequency of seizures was unchanged in 13 cases, lower in 7, and higher in 2.

In the weeks or months after the insulin treatment, the frequency of attacks was unchanged in 14 cases, lower in 5, and higher in 4. Of course, I could not judge the therapeutic value of insulin in

TABLE I.

EPILEPSY AND INSULIN

	Sex	Age	No. of injections	Initial dose	Maximum dose	Shock dose	No. of shocks	Convulsive dose	Perspiration	Weight Kg.	Increase in weight	Fasting blood sugar	Psychic reaction	Therapy: Br.	Therapy: Lum.	Therapy: Bor.	Frequency of convulsions: During treatment	Frequency of convulsions: After treatment	Other observations
1.	♂	33	10	30	110	110	1	1	+	74	2	97, 49; 94, 90	paran. React.	+	1	+	∧	‖	Hyperpyrexia
2.	♂	43	11	30	140	140	1	1	+	83	5	90, 45; 91, 46	—	+	+	+	∧	‖	....
3.	♂	26	5	30	70	—	.	1	+	75	—	93, 47	—	+	+	+	∧	‖	....
4.	♂	25	14	30	150	—	.	1	+	76	6.5	84, 42; 107, 54	Confusion	+	+	+	∧	‖	....
5.	♂	35	8	30	100	—	.	1	+	56.5	—	99, 99	2× severe hyst. excit.	+	+	+	∧	‖	....
6.	♂	16	12	30	120	90	6	1	+	65	3.5	91, 84; 100, 18	....	+	+	+	∧	‖	....
7.	♂	19	9	30	120	—	.	1	+	81	1.5	112, 23; 94, 90	....	+	+	+	∧	‖	....
8.	♂	19	9	40	140	—	.	1	+	77	1	85, 43	....	+	+	+	∧	‖	....
9.	♂	34	9	30	100	90	3	1	+	55.5	1	115, 09	....	+	+	+	∧	‖	....
10.	♂	23	20	30	220	—	.	1	+	86	—	112, 67; 97, 58	....	+	+	+	∧	‖	....
11.	♂	16	14	30	80	80	5	1	+	64	—	90, 99	....	+	+	+	∧	‖	....
12.	♂	20	10	30	85	80	5	1	+	53	—	98, 93	....	+	+	+	∧	‖	....
13.	♂	35	22	30	220	200	5	1	+	105	—	98, 08	....	+	+	+	∧	‖	....
14.	♂	28	8	30	120	100	3	1 (120)	+	65	3	90, 99; 94, 90	....	+	+	+	∧	‖	....
1.	♂	27	2	20	30	30	1	1	+	49.5	—	89, 32; 71, 05	....	+	+	+	∧	‖	....
2.	♂	28	17	30	160	160	4	1	+	86	4	99, 47; 65, 39	....	+	+	+	∧	‖	....
3.	♀	24	12	30	110	100	5	1	+	57.5	5	89, 86; 84, 69	....	+	+	+	∧	‖	....
4.	♀	34	13	30	140	100	6	1	+	60.0	1	105, 96; 104, 55	....	+	+	+	∧	‖	....
5.	♀	36	18	30	170	150	6	1	+	50.5	2	83, 5; 77, 55	Agitated confusion	+	+	+	∧	‖	....
6.	♀	33	11	30	120	90	5	1	+	47.0	—	90, 00	2× excite-ment	+	+	—	∧	‖	....
7.	♀	35	13	30	150	140	2	1 (140)	+	55	2.5	94, 40	....	+	+	+	∧	‖	....
8.	♀	20	13	20	140	—	.	—	+	63	—	111, 65; 84, 25	....	+	+	+	∧	‖	....
9.	♀	23	12	30	140	140	1	—	+	59	5	97, 45; 99, 90	....	+	+	+	∧	‖	....
10.	♀	18	4	30	60	—	.	.	+	51	2	84, 25	....	+	+	+	∧	‖	....
11.	♀	32	7	20	60	—	.	.	+	59	1.5	90, 50	....	+	+	+	∧	‖	....
12.	♀	17	8	50	120	—	.	1 (120)	+	61.5	0.5	131, 95; 101, 50	....	+	+	+	∧	‖	....

epilepsy from this. I have merely demonstrated that one is justified to continue insulin studies on epileptic patients since insulin proved to have no harmful effect on the course of the illness, i. e., no seizures were provoked by the drug.

Conclusion

1. The insulin tolerance of epileptic patients as yet has not been exactly determined in the literature.

2. A series of preliminary studies with intramuscular injections of insulin in quantities varying from 5 to 30 units produced no hypoglycemic symptoms or very mild ones, and above all did not bring on a single convulsion.

3. 18 epileptic patients were given the complete insulin therapy of Sakel and 8 a treatment at least partly analogous to Phase 1.

4. The results were entirely analogous to those obtained in schizophrenic patients, namely, sweating, somnolence, symptoms of myoclonus and tetany. Only a few cases showed psychic changes and finally the usual coma.

5. The shock dose of insulin varied as greatly as it does for schizophrenic patients. It ranged from 30 to more than 220 units. The general and maximal averages varied from 100 to 150 units, respectively.

6. The 18 patients experienced 70 moist shocks and 3 epileptic seizures = 4%.

7. Under the influence of insulin the pulse rate increased and the temperature decreased; profuse sweating occurred in $\frac{2}{3}$ of the patients. The body weight increased throughout, often very strikingly, on the average about 3.5 kg. in 9 days. In comparison, the schizophrenia patients showed an average gain in weight of 3.8 kg. in 46 days, a period more than 5 times as long.

8. There was no direct parallelism between the clinical manifestations and the blood sugar levels, but with increasing quantities of insulin the blood sugar curve was lower and the low levels lasted longer. In the epileptic patients, as compared with the schizophrenic ones, the fall in the blood sugar curve was delayed at first and then sank to lower levels with no intermediate peaks.

9. In 5 cases a psychic change occurred, with excitement and confusion of paranoid, hysteriform, or hypomanic coloring.

10. The seizure-frequency during and after the insulin treatment was not increased.

I considered it my duty to test a treatment that promises such results as the insulin treatment does to see whether it could be carried out in epileptic patients too if proper precautions were taken.

This was done as our results show. But for a definitive answer to our query a larger number of studies must be carried out, particularly studies including necessarily phases 2 and 4. The theoretical significance of my findings, I should not care to interpret, and just as little should I wish to prophesy whether the insulin therapy promises favorable results in treating epilepsy. It is enough for me merely to have carried out the first simple preliminary investigation.

28. EXPERIMENTAL STUDIES OF CONVULSIONS PROVOKED BY CARDIAZOL IN RABBITS

By G. de MORSIER, F. GEORGI, and E. RUTISHAUSER

We were interested to learn whether cardiazol injected in fatal doses into rabbits provoked cerebral lesions comparable to those which Stief and Tokay found in rabbits intoxicated with insulin and whether one can find lesions in the brain of rabbits sacrificed after they have been subjected to a great number of convulsions. Here are our experiments:

Rabbit Number 1. February 16, 1937:

Intravenous injection of 0.35 c.c. of cardiazol 10%. After a few seconds, convulsive crisis similar to that observed in man. The animal recovers within a few seconds. Fifteen minutes later one notes a slight weakness of the limbs.

March 2: Intravenous injection of 0.3 c.c. After ten seconds, tonic convulsions followed thirty seconds later by clonic convulsions. The maximal dilation of the pupils occurs eighty seconds after the injection, and one hundred forty-five seconds after the injection the convulsions are terminated. The convulsions were less pronounced than after the first injection.

March 6: Intravenous injection of 0.2 c.c. of cardiazol 10%. After fourteen seconds mild convulsions lasting ten seconds. After a new injection of 0.3 c.c. one observes very pronounced clonic and tonic convulsions.

March 9: Injection of 0.25 c.c.: no effect: injection of 0.3 c.c.: intense epileptic attack: the rabbit has great difficulty in recovering.

March 10: Injection of 0.3 c.c.: convulsive attack.

March 11: *Subcutaneous* injection of 0.6 c.c. The rabbit has convulsions but these are at a slow rate and last about four minutes.

March 15: Intravenous injection of 0.3 c.c.: no effect: injection of 0.5 c.c.: intense convulsive attack with respiratory disturbances and lasting ten minutes. *Injection of 1/10 c.c. of lobeline Sandoz (strong)*: after this injection the respiration becomes almost normal.

March 16: Intravenous injection of 0.4 c.c.: no effect. One repeats the same dose: no effect. One injects again 0.3 c.c.: very pronounced convulsive attack lasting ten minutes. The rabbit is sacrificed the same day by bleeding from the carotid arteries. On macroscopic examination the brain does not show anything unusual. After fixation with alcohol and Nissl-staining, the sections of the slides do not show any pathology. The vessels and the nerve tissue present a normal aspect.

Rabbit Number 2. March 16, 1937:

Intravenous injection of 0.5 c.c. cardiazol 10%. Great convulsive attack. During the attack one again injects 1.5 c.c. of cardiazol 10%. Continuous status epilepticus and death after twenty-five minutes by respiratory disturbances. The anatomical examination shows that the brain as well as other organs are very congested. After fixation with alcohol and Nissl-staining, one cannot see any alteration of the nerve tissue.

Only the vessels are dilated, particularly those of the meninges.

Thus we could not find any histological modifications of the brain, either in the first rabbit sacrificed after it received nine injections of cardiazol which provoked convulsions, or in the rabbit killed by one massive dose of cardiazol. The only pathological manifestation noticed in the second rabbit was a generalized hyperemia, particularly of the brain, which one commonly finds in case of death by asphyxiation.

It is worth noting that there appears to be some increase in tolerance to cardiazol when it is frequently given, for in the last injections, in order to provoke convulsions in the rabbit, it was necessary to use nearly twice as much of the drug as in the beginning.

Another point is important: lobeline immediately regulated the respiration which was markedly disturbed after one particularly violent attack.

III. DISCUSSIONS ON MONDAY, MAY 31, 1937

29. THE INSULIN SHOCK THERAPY AT THE NEURO-PSYCHIATRIC CLINIC IN ROME

F. ACCORNERO AND L. BINI [1]

The treatment of schizophrenia by insulin coma has been practiced in the clinic for nervous and mental diseases of the Royal University of Rome since November, 1936. In the beginning this treatment, which is still poorly understood in its mechanism of action and in the modifications it produces in the organism of the patients subjected to it, we believe we have accomplished besides the clinical observations a series of technical and laboratory researches aimed at a more fundamental understanding of the character and the mode of production of the very impressing and varied symptomatology.

The long duration and the technical difficulties of this therapy do not permit us at present to base our experience on a sufficient number of observations to formulate statistics or express definitive judgments. Nevertheless we believe it will be useful to report briefly the data gleaned from our incomplete studies, some of which appear to us not without interest.

With regard to the procedure, we wish only to recall that for the insulin shock the method used at present by Sakel was employed with the most recent modifications introduced by the author himself.

The researches on the symptomatology of the coma carried out by Accornero permit us to report the following noteworthy data:

1. Marked paralysis of the ocular muscles was observed in a patient during some phases of the coma.

2. It is possible to demonstrate with the suitable technique, in almost all the patients signs of functional damage not only to the pyramidal but also to the extrapyramidal system.

3. Epileptic attacks may sometimes be induced with very small doses of insulin during the preliminary phase of the treatment. This was observed in a patient in whom there appeared after 35

[1] R. clinic for nervous and mental diseases, Rome.

units of insulin sudden loss of consciousness followed by a typical epileptic attack. The phenomenon was repeated two days later. The shock dose of insulin for this woman was later shown to be about 180-200 units.

4. The noteworthy regression of morbid phenomena in relation to the mental illness which several authors have observed as a transitory change in the hours following coma was not demonstrated by Accornero in spite of precise studies in experimental psychology.

The accurate observations made on the temperature, the arterial pressure and the character of the pulse have in general confirmed the earlier reports of other authors. Not so, however, the electrocardiographical studies made by Dr. Puddu (of the Royal Medical Clinic of Rome) before, during, and after the various phases of the coma. We have seen in the patients so far examined (still too few to draw definitive conclusions) modifications in the electrocardiograms only during the period of shock (phases of tachycardia and sinus arrhythmia, sometimes with increase in the amplitude of the T-wave). Never was their appearance such as might suggest lesions of the myocardium.

The research of Dr. Ciotola (of the Royal Ophthalmological Clinic of Rome) has provided results of interest. In some of the patients during the coma he observed an evident diminution of ocular tension even with a marked increase in arterial pressure.

Before and during the coma studies of the body fluids were made by Dr. Bini as regards the blood sugar, blood chlorides, blood calcium, blood potassium, blood nitrogen, spinal fluid sugar, spinal fluid chlorides, the acid-base equilibrium of the blood, spinal fluid and urine.

The blood sugar after a certain number of shocks tends to maintain constantly a level above normal. It falls during the period of coma, but not in a constantly progressive manner. As a rule it shows a relative rise in the second or third hour after the injection of the insulin.

The blood chloride starts from a rather low stationary level and diminishes further during coma.

The blood calcium is stable at a normal or slightly low value and tends to fall almost regularly during the hypoglycemic phase.

The blood potassium after a definite number of repeated shocks reaches values notably above normal. During the coma it diminishes in some cases to a marked degree but remains always in excess of physiological levels. The presumptive relation noted by several authors between the blood potassium levels and the therapeutic results of the treatment was not confirmed.

The acid-base equilibrium of the blood often shows a tendency toward alkalosis even before the administration of the insulin. This tendency is accentuated during coma, although it is often more or less evidently compensated by changes due to intense muscular activity and disturbances of respiratory exchange. During the hypoglycemic state there is almost always a constant discharge of alkaline substances in the urine.

The spinal fluid sugar diminishes almost proportionally to the blood sugar, but only in cases where two samples of spinal fluid have been withdrawn: one before the coma and the other during it, so that compensatory secretion of spinal fluid is induced during the hypoglycemic state. Otherwise the quantity of glucose in the fluid may be regarded as practically independent of the action of insulin, so that during coma the normal blood-cerebrospinal fluid ratio is inverted.

Likewise the normal figures for the acid-base equilibrium of the spinal fluid undergo no changes in the hypoglycemic state.

The results of these researches permit us to agree rather with those authors who do not recognize hypoglycemia *per se* as the direct cause of coma. We are moreover forced to hold as erroneous the opinion of those who relate the symptoms of insulin shock to the alkalosis of the blood or to changes in the Ca/K ratio. Finally, on the basis of considerations suggested by the changes which we have pointed out and from certain symptoms presented by the patient under the influence of insulin (marked increase of many secretory functions, abrupt alterations in the symptomatology, which are sometimes spontaneous and accompanied by a transitory return of consciousness), we believe that we can deny any great probability to the theory which explains the advent of the hypoglycemic symptomatology as a manifestation of toxic phenomena. Instead we feel justified in admitting a new hypothesis to explain the pathogenesis of the insulin coma by referring it to modifications

of the water-salt exchange and consequently of the physico-chemical forces of the body fluids (osmotic and oncotic pressure).

Before reporting the clinical results we have obtained, we wish to explain that we have gained the impression that the convulsive attack, or in general the appearance of frequent and intense manifestations of cerebral irritation, give the insulin treatment the likelihood of having favorable therapeutic prospects. We have therefore in nowise hindered or mitigated the manifestations of these particular symptoms during coma. Of course we have kept within the limitations of the possible perils inherent in them. Indeed, we thought it would be wise to go still further: in those patients in whom the coma habitually ran a course with few irritative manifestations we attempted to modify it in the direction mentioned above which was in our eyes more efficacious from the therapeutic point of view. For this purpose the treatment was suspended for a day during the second phase, and on that day an epileptic attack was induced by cardiazol according to the technique of Meduna. The following day the treatment with insulin was resumed in doses sufficient to produce coma. Up to the present time this joint therapy has been repeated more than once and has shown itself useful in the way we desired, as a means of producing in the later phases of the insulin therapy more frequent and intense epileptic manifestations, with doses of insulin smaller than those necessary to produce coma without the addition of cardiazol.

As far as our experience with the clinical results of the insulin shock therapy goes, we consider it of value to state that although the results obtained so far have destroyed excessively optimistic illusions that might be drawn from the literature, still they may be considered favorable enough to justify the further use of this method of treatment. Of the patients whom we are following in the clinic in Rome twelve have completed the course, and we may say that we have abandoned all hope of benefit in two cases only. Here we are dealing with schizophrenic patients who have spent 7-8 years in psychiatric institutions and present the typical clinical picture of the disease in a stage of most profound apathy.

Without entering upon a detailed exposition of the clinical results obtained with each of the other patients observed by us, we may state simply by way of summary that the treatment was followed by total remission or evident improvement to a greater or less

degree. More exactly, in 4 cases there was total remission, in 2 great improvement and in 4 slight improvement.

In the group of patients who showed improvement only, we may note in particular the following therapeutic results: 1. There was a marked decrease or complete disappearance of the external spontaneous manifestations of the disease with a great reduction in the state of excitement when such a state was present.

2. There was a marked decrease or complete disappearance of hallucinatory disturbances and of pseudo-hallucinations.

3. There was less frequent and less intense verbal perseveration and stereotypy. All the patients have been able to recognize more or less completely the morbidity of their previous disturbances.

In conclusion we may affirm that the insulin treatment, whenever total remission has not been realized, has shown its chief favorable effect on the numerous morbid constellations grouped about the fundamental nucleus of the schizophrenic mentality, which expresses itself in disturbances of the affective-emotional and volitional spheres. We must ask ourselves whether the permanence of this morbid nucleus, which may often be thought of as developing on a constitutional basis, is a *"signum mali hominis,"* enabling us to predict with great probability changes for the worse and relapses. It is not possible to make statements of this sort *a priori,* especially since the observations of many authors seem to answer the question in the negative.

At present we wish to abstain from any judgment while we wait for greater personal experience.

30. OBSERVATIONS AND RESULTS OBTAINED IN THE INSULIN TREATMENT OF 52 PSYCHOTIC PATIENTS

By N. BENO [1]

So many shock treatments have been introduced into the psychiatric practice these last years which in the beginning were considered as very specific treatments, but ultimately have proven to be very limited in their indications and therapeutic action, that one therefore feels justified in wondering whether insulin as a therapeutic means to be used in schizophrenic patients will stand the

[1] Asylum Malévoz-Monthey. Director, Dr. A. Repond.

hypnotics, which in general have the inconvenience of increasing the state of confusion at the awakening.

The duration of the mental relaxation in the different conditions which we just mentioned varied from one to several hours.

In order to render the psychotherapeutic action more efficacious, we have given insulin in small doses to a few patients suffering from depression and asthenic phenomena.

As it is being done everywhere, the insulin-shock therapy was used in all the clinical forms of schizophrenia (Tables I and II) and as a therapeutic attempt also in a few cases of mania and in one case of melancholia. Let it be understood however, that with regard to the manic depressive states, we tried above all to utilize the sedative action of insulin either for the purpose of combating the strong manic agitation or in order to obtain a sedative effect on the anxiety disturbances. The shock, in cases where it did occur, was not sought.

1. *Hebephrenia.* Out of eleven cases of hebephrenia which we treated and in which the duration of the illness up to the beginning of the treatment varied from one day to ten years, five were cured socially. They could go back home and back to their usual activity in a mental state which was certainly better than the mental state before the crisis. Unfortunately, one of these patients relapsed and came back to us after he stayed home for seven weeks. Four other hebephrenic patients showed considerable improvement during the treatment but only in two of them was the improvement maintained after the cessation of the treatment which in the last-mentioned cases was carried out for more than two months. Finally two hebephrenic patients of our group were not influenced by the treatment.

2. *Catatonic States.* Following the generally accepted nomenclature we divide our patients into two groups: agitated catatonics and catatonics with the syndrome of stupor, although in our opinion this division does not strictly correspond to the clinical aspect of our cases.

a. *Agitated catatonics.* In this first group comprising fifteen patients we obtained social cures in nine, improvements in four, no change in three, and relapses in three.

b. *Catatonics with the syndrome of stupor.* This group includes nineteen catatonics with stupor. We obtained in this

group social cures in seven, improvements in seven, no change in five, relapse in one, and death in one.

3. *Paranoid States.* We used the shock treatment in two cases of paranoid psychosis with no results. It is true, the duration of the psychosis in the two cases was of several years. It is interesting to note: we did not observe as other investigators did, any

TABLE I.

Diagnosis	Duration of illness	No. of cases	Social remission	Improvement	No change	Discharges	Relapses	Deaths
Hebephrenia	1– 6 months	7	4	2	1	6	—	—
	6–18 months	2	—	1	1	—	—	—
	18 months and more	2	1	1	—	2	2	—
Catatonia and agitation	1– 6 months	9	8	1	—	8	1	—
	6–18 months	1	—	1	—	—	1	—
	18 months and more	5	1	2	2	3	1	—
Catatonic stupor	1– 6 months	6	5	1	—	6	—	—
	6–18 months	8	1	3	3	4	—	1
	18 months and more	5	—	3	2	—	—	—
Paranoid	18 months and more	2	—	—	2	—	—	—
	Total.....	49	20	15	11	29	5	1

TABLE II.

Duration of illness	Social remission, %	Improvement, %	Discharge, %	Relapse, %	Deaths, %
1– 6 months.....	77.27	18.18	90.90	4.54	2.05
6–18 months.....	9.09	45.45	36.36	9.09	
18 months and more.....	14.28	42.85	35.07	21.42	

change in the hallucinations in the face of the hypoglycemic relaxation. Moreover, psychotherapy which we tried in these two cases proved ineffective. This observation is of interest in view of the fact that in the catatonic states complicated by more or less paranoid manifestations, we were able to establish a good rapport and even exercised a certain psychotherapeutic action at least during a part of the treatment.

Manic Depressive States. In the two cases of acute mania the treatment gave us significant results. The first case was characterized chiefly by successive crises, associated with very pronounced disorders of character. The end of the crises did not reach a complete psychic remission. There were still present certain elements of confusion and a certain disturbance in the association of ideas.

Several attempts to discharge the patients were unsuccessful. In the last admission of the patient the insulin-shock therapy was given. The result was encouraging. Beside the very marked sedative effect on the manic disorders after each shock treatment—an effect which was maintained for four or five hours and sometimes longer—the manic attack progressed rapidly toward cure. The patient left us in an excellent condition and the remission has been maintained for a year.

One patient with melancholia and a very pronounced anxiety syndrome showed no change after about two months of treatment.

Finally, we had the sad result of losing by sub-acute pulmonary oedema, one of our patients afflicted with schizophrenia and depression at Malevoz under very dramatic conditions in the midst of the insulin treatment. Space limitation does not permit us to dwell upon this case which is, nevertheless, very interesting. The circumstances of this death have remained obscure. We are not far from believing that the heart condition played a rôle, notwithstanding the fact that an objective examination did not reveal the slightest organic disorder.

Of course this death obligated us to increase our precautions in the applications of the shock therapy. Being convinced that the main factor in the accidents lies in the administration of insulin, which is sometimes a brutal administration which in certain cases is responsible for causing a very severe humoral disequilibrium, we gradually were led to modify Sakel's technique. The modification has been used, it seems to us, also by others; Sakel himself made use of it. To our merit, however, is the fact that we applied it systematically in all of our cases and on a large scale.

This technical modification consists of the following: Instead of giving the patients a progressively higher dose of insulin every day until shock reactions are obtained, we give the same dose during two or three days according to the reactions of the patients, and after having naturally reached with the usual method a certain threshold for insulin corresponding empirically to the precomatose dose.

This modification, although slight as such, is nevertheless quite important because of its influence on all the hypoglycemic manifestations. Moreover, it appears to render the method safer inasmuch as the accidents during the treatment are markedly diminished. From the theoretical standpoint, it also somewhat contributes to the

problem of sensitivity and resistance of patients to insulin. Generally speaking, one may say that the sensitivity is diminished and consequently the resistance to the shock is more or less increased, thanks to our technique. This resistance to the insulin shock has, besides, according to our observations, no unfavorable influence on the total duration of the treatment.

In summary, here are the most important observations which we made in applying our technique:

1. We are dealing with an essentially practical advantage. The insulin treatment is going on in our insulin pavilion in an atmosphere of relative calm. The patients in general pass almost without any transition phase from somnolence to shock.

2. The hypoglycemic phase is usually longer. We already mentioned the fact that we took advantage of this situation for intensifying the psychotherapeutic effect in some of our patients who become more accessible to suggestion in this phase.

3. The shock appears to be more profound. We grant that one deals here with a subjective impression. We have the feeling that the hypoglycemic manifestations take place in the depth where habitually the same phenomena come to the surface (myoclonias and other motor disturbances).

4. But the most important advantage of our technique consists of a notable diminution of the myoclonic phenomena and the epileptic accidents. In this respect we make the following observations: from March to June, 1936, that is during three months, we noted eleven epileptic crises; from June to December, that is during six months, we had to take care of only two epileptic attacks. Besides, one of these two attacks was induced for experimental purposes in using the classical method.

Finally, the last practical point—the method of Sakel, thus modified, can be used cautiously in a certain number of patients who react exclusively with epileptic seizures.

In conclusion, we can say that the method of Sakel is a very valuable addition to the therapy of schizophrenic conditions. In allowing the dissolution of the inhibitory factors in the psychosis, it favors sometimes in a remarkable way, the psychological investigation, and speeds up the normal process of cure.

31. EXPERIENCES WITH THE INSULIN THERAPY IN SCHIZOPHRENIA WITH SPECIAL REFERENCE TO CLINICAL PROBLEMS

J. P. FROSTIG [1]

At first only 3 elements were concerned in the original method of Sakel: the dose of insulin required to produce the shock, the insulin shock itself and the improvement in the patient's condition. In this equation the improvement was the only quantity to be presumed as known. The size of the dose of insulin and the depth of the insulin shock could be determined only from case to case and from day to day on the basis of the alterations which took place in the schizophrenic condition. But "psychic" improvement is no adequate standard for determining the dose of insulin. It is due entirely to the investigator's gift for accurate observation and his sense of clinical signs that these relative considerations, at first so vague, could finally develop into a practicable empirical method of treatment, a method which, as I shall show, has also stood the test of a precise control. The method, as it was understood by the workers in the Vienna clinic, may be reduced to the following formula: the symptoms of schizophrenia may be favorably influenced if one treats the patient with a series of insulin shocks which are as deep as possible and which may be prolonged up to 5 hours.

The formula of the Vienna clinic offered future investigators certain points of attack and yet furnished no manual for a uniform method of manipulation. The therapy could be learned only by personal instruction and direct observation; those investigators who applied it on the basis of the literature alone often went astray. The result of this was that a number of works appeared which were designed by their authors, in perfectly good faith of course, to be tests of the Sakel's method but were actually based on a different, though somewhat similar, method.

At my institution I have been able to create a special, technically well-equipped station for the insulin therapy, in which I could continue under favorable conditions the researches of the Vienna clinic. My colleagues Kister, Manasson, Matecki, and Persyko and

[1] Director of the Psychiatric Institution "Zofiówka," Otwock, near Warsaw.

I have made it our aim first of all to systematize the plan of this therapy, and, wherever possible, to follow the investigations of the Vienna clinic in clinical details. Regarding the results, which have followed the lively exchange of ideas between Dr. Sakel and his colleagues of the Vienna Clinic: Dr. Palisa and Dr. Dussik, and Docent Müller and me, I shall now report briefly.[1]

If we analyze the three basic notions, 1) insulin shock dose, 2) deep five-hour shock and 3) psychic improvement, we see that the last two, deep five-hour shock and psychic improvement, are functions of the first, the required dose of insulin. If we wish to study the interdependence of these three factors, that is, by varying the one learn to know the variations of the others, then we must begin with the dose of insulin required.

There is, however, one obstacle in the way, which is inherent in the character of the effects of insulin. There are patients for whom the shock dose of insulin is 17 units, yes, even as little as 8 units, and others in whom the condition of shock is not reached until after the injection of 300 units. After the shock was designated by the Vienna school, and rightly so, as the therapeutic agent, we made it our first task, while keeping the clinical rule of the deep 5-hour shock, to separate the therapy from the clinical course of the psychic improvement and first of all to study the relations between the insulin dose on the one hand and the insulin shock on the other. We first set ourselves the problems: (1) to gain as exact an idea as possible of the qualitatively diverse signs of the shock, and (2) to organize these signs in such a way that the value of the time element would be expressed.

Afterwards we investigated to what extent the various clinical changes and their time sequences are dependent on the dose of insulin. Finally, we tried to balance the clinical value of the different phenomena against each other, with reference to the two questions from the Vienna clinic. Translated into clinical language our questions were:

1. What clinical value do the individual symptoms have with respect to the syndrome of the shock?

[1]The detailed results and the clinical material will be recorded in another publication.

2. Can one influence the time element of the shock at all by variations in the dose of insulin? If so, is it possible to conduct the treatment in such a way as to produce a 5-hour shock without conditions arising that might endanger life?

The qualitative symptoms of the shock may be classed as (1) the psychic symptoms, (2) the syndrome of disturbances of consciousness, (3) the motor syndrome, and (4) the autonomic syndrome.

The value of these four syndromes is different. Disturbances of consciousness appear as the most constant. Freudenberg and Dussik divide these disturbances into (1) sleep, (2) clouded consciousness, (3) stupor, and (4) coma.

The disturbances of consciousness form the most essential criteria for distinguishing the insulin shock from the milder states of hypoglycemia. We designate as the beginning of the deep shock that moment in which contact for call and touch is lost. The disturbances of consciousness are limited in time. We regularly see the sequence of sleep, clouded consciousness, stupor and coma. Of course the syndrome of the disturbances of consciousness loses its value for further chronometric observations since the picture of these disturbances is massive and uniform and furnishes no index for the further progress of the insulin intoxication. The motor syndrome offers us the greatest number of vantage points for the observation of the course of the shock.

Angyal has been able to demonstrate, by pathological analysis of the brain, that the toxic effects of insulin are felt first by the phylogenetically latest parts of the central nervous system, then by the subcortex and the pons, and finally by the medulla oblongata. We also see first the spontaneous movements which pass over into the primitive movements. Often they change abruptly, but again almost imperceptibly, to tonic-clonic twitchings, and finally into tonic convulsions. Along with the subcortical phase of the shock there are signs of disturbance of the pyramidal tract. The reflex zone is slowly broadened and thereupon all the toe phenomena are seen. The signs of central excitation and disabling are interchangeable so that very different and very manifold pictures of the cerebral pathological syndrome appear and disappear. By and large we were able to confirm Angyal's assumptions in our material. We also agree with the assumption that as a rule

toxic effects on the central nervous system are to be observed. Of course, with this, as with all rules, there are exceptions. The motor manifestations are always of great importance. When unconsciousness has already begun, there comes the appearance of the tonic-clonic convulsions, the toe phenomena, etc., a proof of the fact that the toxic effects of the insulin have spread to greater areas of the brain.

Independently of Angyal and on a purely statistical basis, we have been able to demonstrate, as regards the clinical judgment of the shock, that the constant tonic convulsion, in which the fists are always clenched, is to be taken as a symptom threatening life. We assume that here we are dealing with the signs of decerebration. Angyal's paper taught us that the tonic convulsion actually is to be considered the final phase in the descending toxic action mentioned above. From his paper we got the idea that the tonic convulsion signifies the natural limit of shock, a limit beyond which shock cannot be extended without endangering life. This observation had great significance in the question of the time element in shock and the variability of the factors concerned. We could now set ourselves the task of inducing shock of such character that the tonic convulsions would not appear before the fifth insulin-hour. The importance of the autonomic symptoms is less than that of the motor phenomena. We were able to determine that the temperature regularly falls, and falls parallel to the depth of the shock; in 2.7% of all shocks we observed temperatures between 30° and 32° C, but we were not able to find this clinically significant. The nature of the pulse also offered no characteristic symptom for the management of the shock. In 1000 shocks we counted a pulse rate under 60 in 15%, 60-90 in 37.7%, over 90 in 32.7%; in 14.6% we recorded fluctuations from below 60 to over 90.

Of course the behavior of the pulse forms the most delicate indicator for the conditions that threaten life. We were able to establish the fact that tonic convulsions are almost always accompanied by a steep pulse curve. The pulse rate speeds up during the tonic convulsion to 120-160 to sink back to the original level in the period of relaxation. Along with the tonic convulsions and pulse irregularities there are respiratory disturbances. These are partly due to tonic muscular spasms and partly to central dis-

turbances. Autonomic disturbances may enter into every phase of the shock as isolated phenomena. However, we do not often see this. Yet one must be on his guard against cardiac and vascular collapse even when there are no tonic convulsions. Evidently, this hypersensitivity of the autonomic centers seems to be the result of the individual's nervous make-up. We see that it is accentuated in individual cases.

The psychic disturbances appear as confusion and psycho-motor excitation. After the awakening they return in the same form. Since they are not constant, we have postponed studying them.

From this short review of the symptomatology we can draw our practical conclusions about inducing shock. The most important consideration seems to us to be to induce shock of such sort that the tonic convulsions and the centrally dependent autonomic disturbances will not appear before the 5th insulin-hour. In the therapeutic shock there are three important times marked by the following signals: (1) by the appearance of unconsciousness in the course of the third insulin hour; (2) by the appearance of the toe phenomena in the course of the fourth insulin-hour, and (3) by the appearance of the tonic convulsions or the central-autonomic disturbances at the end of the fifth insulin-hour.

Mere empirical experience has shown us that with too drastic a decrease in the dose of insulin the patient might wake spontaneously, and, on the other hand, too large an amount of insulin might endanger the patient's life. In order to study the problems more in detail we laid down for ourselves the principle of determining the dose for a given day on the basis of the chart of the day before. If unconsciousness appeared in the second hour after insulin and the Babinski in the third we decreased the dose; if these signs appeared too late we tried to increase it. We strove to keep the shock picture as nearly as possible identical or similar. In this we did not succeed. The shock pictures remained different, and we had to admit that a whole series of other factors took part in the formation of the shock picture. But we could find the rule confirmed that in the majority of cases the symptoms retrogressed in time: the separate phases, the cortical, subcortical, etc., occupied shorter periods, and vice versa if we increased the dose of insulin the separate phases were extended.

By a careful analysis of the shock picture we could also avoid practically all danger. While we had to interrupt the treatment in 7.1% of the first 1000 shocks as a result of danger signals, in the next 500, treated in accordance with the principle stated above, we had barely 3.6% interruptions. Of course there are exceptions here too. One would look askance at a biological rule without exceptions.

I shall take time only to report briefly our results from the treatment. We treated 23 recent cases and 30 old ones by this method. Of the 23 recent cases 20 showed complete remission, 1 incomplete improvement, 1 negative results and 1 *exitus lethalis*. The percentage of complete remissions in this group was 86.9%. The unimproved and negative cases are striking in that they were both cases of climacteric schizophrenia. Of the 30 old cases 7 showed complete remission, 3 incomplete improvement, 5 slight improvement, 15 no improvement. The percentage of complete remissions among the old cases was 23.3%. The percentage of full and partial or social remissions in our material was 60%. In the complete remissions we have had 4 relapses, or 14.8%. 2 of these have been treated again and discharged after full remissions. The other 2 did not return for treatment.

3 of the patients with social remissions returned for further treatment which resulted in full remissions for 2 of them. The third was discharged with incomplete remission.

The average number of shocks was 27. The average maximal dose of insulin was 131 units. We had cases in whom the improvement set in suddenly at about the fortieth shock.

On the basis of the material treated we can speak only of improvement at present. We have used the therapy in our institution for too short a time to be able to form an opinion regarding relapses. We may definitely assert that with the help of the insulin treatment we were able regularly to bring about the disappearance of the symptoms of schizophrenia in recent cases, that is, cases in which the processes of the disease had not been present more than 1½ years.

The principle that the results of the treatment are in inverse ratio to the duration of the illness loses its validity when we consider our group of old cases. We see 7 complete remissions distributed without regard to the duration of the disease; 3 of the cases were of 2 years' standing.

The relatively large number of relapses is disturbing. We wish therefore to refrain from any judgment on the question as to how radical the cure is.

We have nothing to say about the nature of the treatment. Our conjectures are based exclusively on theoretical considerations. We are treating a disease quite unknown biologically and treating it indeed with an unknown drug. The stage of research in which we are now reminds one of the lues therapy of 100 years ago, when the "French disease" was treated with any dose of mercury one cared to use. And it is exactly the history of the discovery of salvarsan with its early under- and over-dosage, its fatalities and relapses, which gives us the courage to go further on this road and even to hope that with a better understanding of the therapy we may reach the goal of cures that can be relied on to last.

32. THE QUOTIENT OF BLOOD SUGAR FALL. A CONTRIBUTION TO THE QUESTION OF INSULIN SENSITIZATION

J. P. FROSTIG, J. PERSYKO, H. PERSYKO [1]

(PRELIMINARY REPORT)

Even in his early work Manfred Sakel mentioned the fact that the dose of insulin required in the beginning to produce shock in a schizophrenic patient cannot always be kept constant in the course of further treatment. Instead it was often necessary to raise or lower the number of units employed if the same degree of insulin effect was to be secured. M. Müller designates this phenomenon as "sensitization."

As Frostig has explained elsewhere, a very special clinical importance is attached to sensitization. The continued use of the original shock dose in the face of increasing sensitivity may lead to situations endangering the patient's life. The recognition of this change in the reactivity of the body often leads the therapy out of its proper course by compelling the physician to induce shorter and shorter shocks.

[1] From the Psychiatric Institute "Zofiówka," Otwock, Warsaw (Director: J. P. Frostig).

We turned our attention early to this problem. We were able to demonstrate that sensitization finds its expression in the fact that during the course of treatment the blood sugar curves assume a new form. It seemed to us that the lowest point of the curve kept falling lower, but we could find no single explanation for this observation. We recognized two basic factors in this inconstancy of the blood sugar curve:

1. The changes in the dose which are usual in the insulin treatment of schizophrenia make it difficult to compare blood sugar curves.

2. The fasting blood sugar is an expression of the reactivity with regard to the metabolism of carbohydrates in general. With differences in the fasting levels, therefore, the same quantity of insulin may have different effects.

In order to exclude these sources of error we set up the following scheme of clinical investigations:

1. We chose as subjects schizophrenic patients who refused to eat and to drink. By tube feeding we could attain ideal diets for comparison. Thus we ruled out as completely as possible errors arising from inequalities in diet.

2. The subjects were given daily 10 units of insulin "Novo." The blood samples were taken at half-hour intervals and the sugar determinations made by the Hagedorn-Jensen method. The period of observation was 240 minutes.

But by itself this scheme also led to no uniform results. It became evident that even with a constant diet the fasting blood sugar varies from day to day. Therefore, in keeping with the foregoing considerations, the minimal value also is relative. Further exclusion of this source of error was possible only if an equation could be found relating the fasting blood sugar and the lowest point on the blood sugar curve. After various attempts the following formula was found most adequate:

$$\frac{\text{Fasting blood sugar for a given day}}{\text{Lowest blood sugar}} = \text{Quotient of blood sugar fall (BSQ)}$$

$$\text{Example:} \quad \frac{\text{Fasting level 107 mg.\%}}{\text{Lowest blood sugar 48 mg.\%}} = \text{BSQ } 2.2$$

The investigations are not yet concluded. But we can report a result from our current work. In all the cases studied the BSQ rose although the dose of insulin and the patient's diet were kept

constant. (See Case 1, G. and Case 2, Z.) This rise lasted as a rule until the 9th day of the insulin injections. At this time the quotient of blood sugar fall (BSQ) seemed to become irregular. The number of investigations made so far is too small to enable us to form an opinion concerning any regularity thereafter. We have already demonstrated that a patient who shows a BSQ of 1+ on the first day of insulin has a BSQ of 2 to 3 from the 9th to the 12th days.

1. CASE G.

Insulin-day	Fasting level	Lowest blood sugar level	BSQ
1	114	72	1.6
2	84	61	1.4
3	108	62	1.7
4	110	64	1.7
5	90	42	2.1
6	120	55	2.2
7	119	57	2.1
8	107	48	2.2
9	105	40	2.8
10	102	48	2.1
11	107	56	1.9
12	108	51	2.1
The control without Insulin shows:			
13	111	86	1.3

2. CASE Z.

Insulin-day	Fasting level	Lowest blood sugar level	BSQ
1	97	81	1.2
2	85	65	1.3
3	115	67	1.7
4	102	66	1.5
5	85	47	1.8
6	110	61	1.8
7	98	51	1.9
8	108	63	1.7
9	114	55	2.1
10	95	68	1.4
11	105	62	1.7
12	115	82	1.4
The control without Insulin shows:			
13	104	106	1.0

I cite as examples 2 series of studies: After the first blood samples were taken the patients received daily 10 units of insulin subcutaneously. On the 13th day the blood sugar curves were studied as a control. (See Table, Cases 1 and 2.)

The fluctuations in the BSQ may easily be explained by general systemic reaction changes in the body.

The situation is different with the quotient of blood sugar fall if the dose is increased and if the diet is not kept constant. As might be expected, the fluctuations are much greater. Here too the BSQ rises at once to high levels, attaining enormous values in comparison to the former series of studies. We took the blood samples again at half-hour intervals but continued the tests for five hours.

I cite 2 series of studies which illustrate how high the BSQ may rise (Table, Case 3, M. and Case 4, L.).

The exact evaluation of these findings will be published in a special work. Now, however, it has been clearly shown that when

the BSQ is plotted in the form of a curve, there is great irregularity except for the regular rise in the early days. The dose of insulin plays a much less important rôle than the position of the insulin day.[1] This may be seen in Case L. from a comparison of the 23rd and 24th insulin-days. We see here that on the one day the administration of 70 units was followed by a myoclonic vasomotor collapse. On the next day only 20 units were given, and

3. Case M.

Insulin-day	Insulin-dose	Fasting level	Lowest blood sugar level	BSQ	Effect
1	20	103	78	1.3	
6	90	112	61	1.8	
7	100	104	68	1.5	
8	110	113	59	1.9	
9	120	106	50	2.1	
10	125	97	48	2.0	
12	140	97	46	2.1	
13	145	102	46	2.2	
15	160	110	51	2.2	
17	180	96	40	2.4	Collapse
18	20	112	64	1.7	
20	103	76	38	2.0	
21	140	101	55	1.8	Shock
22	150	121	37	3.2	"
23	160	100	27	3.7	"
24	170	117	42	2.8	"
25	180	104	28	3.7	"
26	185	100	33	3.0	"
27	190	110	37	3.0	"
29	210	94	22	4.3	"
30	210	103	20	5.1	"

4. Case L.

Insulin-day	Insulin-dose	Fasting level	Lowest blood sugar level	BSQ	Effect
1	20	98	75	1.3	
12	10	117	69	1.7	
14	20	112	63	2.2	
23	70	138	58	2.4	Collapse
24	20	134	55	2.4	
28	75	124	43	2.9	Collapse
56	28	132	74	1.8	
57	35	118	54	2.2	
58	40	116	45	2.6	Shock
59	40	107	30	2.7	Collapse
60	38	115	38	3.0	Shock
62	36	118	37	3.2	"
63	36	115	53	2.2	"
64	38	125	47	2.7	"
66	38	130	35	3.4	"
67	38	117	33	3.6	Collapse
69	36	120	36	3.3	Shock
71	36	140	51	2.7	Collapse
72	36	121	41	4.3	Shock
73	36	126	42	3.3	"
74	36	111	39	4.0	"

the blood sugar curve was plotted. In spite of this difference in the dose the BSQ remained the same.

Preliminary Results

1. From the studies made, the conclusion to be drawn is that sensitization represents a universal law in the action of insulin.

2. In formulating an opinion on the pathophysiological manifestations of the effect of insulin, consideration must be given not only to the dose, the period of action, certain constitutional factors etc., but also to the position of the insulin day and the quotient of the blood sugar fall.

[1] By position of the insulin day we mean the place of a given day on which insulin was injected in the course of a series of insulin injections, with respect to alterations in the reactivity of the body (sensitization).

33. THE HYPOGLYCEMIC STATE AS OBSERVED BY THE SUBJECT

E. KÜPPERS, ILLENAU-BADEN

Although clinical and anatomical findings as well as experiments with animals are valuable in establishing the nature of the hypoglycemic state, they need to be supplemented by data of a psychological nature. For it is only when we know the subjective feelings in the hypoglycemic state and what changes in reactivity this state produces, that we are reasonably safe from mistaking the unessential for the essential, the accident for the main effect.

With this in mind, at the very beginning of our therapeutic endeavors with insulin last summer, I persuaded Miss J. Wiedeking, one of the assistants in our institution, to submit to Sakel's insulin treatment up to the very onset of the coma and to report her experiences continuously, and also at definite times to demonstrate her ability to react or allow it to be tested. She devoted altogether 21 forenoons to the project, and persuaded 2 students to take insulin with her, so that our results are based on observations made in the course of 36 forenoons or 144 hours of experiment. The detailed report of the study will appear in one of the next volumes of the Zeitschrift für die gesamte Neurologie und Psychiatrie.

In summarizing the significant elements in our results, first a negative finding seems to me important. There was no trace of any impairment of sensibility to painful stimuli in the period preceding coma. By this peculiarity the hypoglycemic state is most sharply distinguished from the stage of delirium preceding narcosis, where painful stimuli no longer hurt although they are still clearly perceived.

We learned from our experiments that a subject who no longer reacted to painful pinching in precoma by any sort of defense movement complained later of having been hurt very much. Even in the complete unconsciousness of coma, pain seems to be worked over into dreams.

This corresponds with the well known fact that our comatose patients rarely show a complete loss of reactivity to pain. Before our therapy made us acquainted with hypoglycemic coma, we were all more or less inclined to regard deep unconsciousness and loss of response to pain as equivalent. This idea is a mistaken one as

we all know now. The earmark of the hypoglycemic coma is not the damping or abolition of defense reactions to pain, but only an alteration in the form of the reaction. The rapid, purposeful, fine movements are changed to delayed, aimless, coarse reactions. Therefore, when the coma is deepened to the danger zone, there is in nowise a general relaxation such as surgeons desire for their operations, but on the contrary a general heigthening of tonus dependent on the state of stimulation.

Passing on to the positive experiences of our subjects on the way to coma, the following series deserves examination:

1. On the physical side sensations of hunger and exhaustion are typical.

2. On the affective side we find listlessness and disinterestedness, but irritability in case rest is disturbed.

3. On the psychic side there appeared weariness and distaste for activity.

4. For the state of consciousness, vacancy of ideas, delay and difficulty in thinking, impaired concentration and conceptual power and difficulty in remembering were significant.

If we ask for the explanation of all these phenomena it is easily found. Blood sugar lack is lack of nourishment. Hence comes the feeling of hunger. Blood sugar lack is also deficiency in energy-producing material. From this comes a general adynamia. This is felt as exhaustion with psychic manifestations of loss of interest and sluggishness. In performance tests it shows itself as inability to concentrate, resting on an adynamia of the psychic center of the personality, and as difficulty in bringing into play the means of conception (difficulty in thinking) resting on an adynamia of the tools of the personality.

It is interesting that the failure of the faculties shows a definite order of sequence. If we compare the distribution of association types on successive days with increasing doses of insulin (fig. 1), then we see that the higher faculties which require a more complex apparatus for their realization suffer before the lower ones. (The ration of "inner" associations lags behind that of the "outer" ones.) This breakdown of the faculties goes hand in hand with a release of short circuit reactions which normally are suppressed. (Irrational associations enter in.) In other words, the breakdown of conceptual activity in hypoglycemic states shows the same regularity as the simultaneous breakdown in reflex activity. The sup-

pression of the higher reflexes goes hand in hand with the release of the lower ones (mouth movements, grasping, local muscle reflexes, Babinski). (We should note in this connection the effect of a day without insulin, September 27, figure 1. The body had time to prepare itself metabolically for the new dose of insulin.

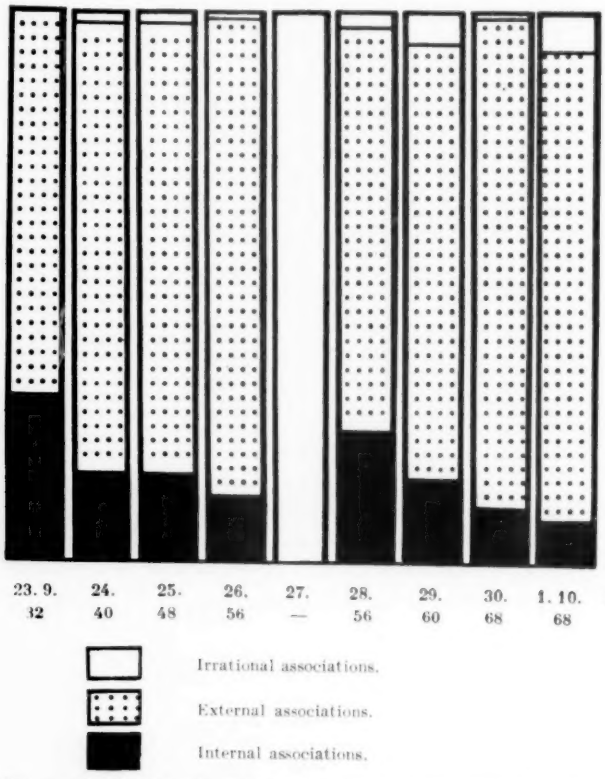


FIG. 1. Distribution of types of association with increasing doses of insulin.

With the same dose therefore it became less adynamic with the result that the distribution of association types again approached the normal.)

The cause of these changes is the deficiency in blood sugar and not factors such as the excess of insulin or even the compensatory discharge of adrenalin, as is evident when we examine the changes in performance shown on one morning (fig. 2).

Figure 2 shows 3 corresponding groups of curves labelled I, II, III. Curves I were constructed by assembling the results of 3 successive days on which the dose of insulin was small (20 to 32 units). Curves II give the results of a day when a medium dose

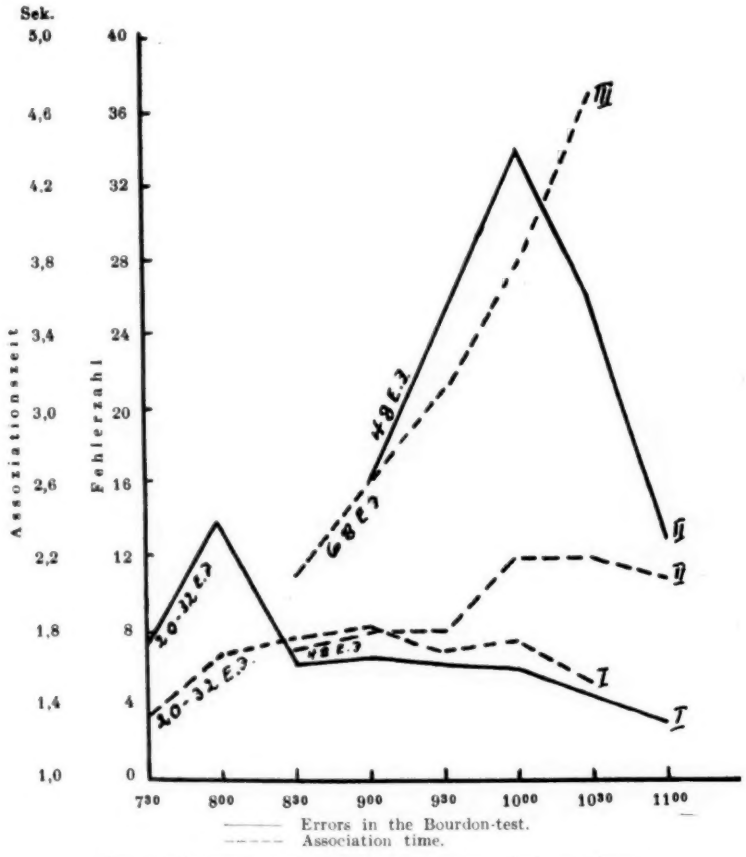


FIG. 2. Changes in performance capacity in one day's experiment.

was used. Curve III represents a day on which coma was produced. The ability to concentrate was regularly tested (according to Bourdon) and conceptual ability (in the association test). With the largest doses of insulin concentration could not be tested because of the appearance of disturbances in the eye muscles.

If we think of the two curves labelled I as combined, the new curve thus obtained will be found to run almost parallel to the blood sugar curve, which, as is well known, reaches its lowest point about 1½ hours after insulin and then rises again so as almost to reach the norm before the end of the 4th hour. The peak of the performance curve is shoved over into the 3rd and 4th hours. But here we see also how the comparison paves the way for the conclusion. This parallelism fails only with a dose that produces coma, when the curve runs straight to infinity.

Now it is known that in those cases in which coma sets in, the blood sugar level rises again, at least a little, near the end of the experiment. To explain this asymmetry the assumption has been made that as coma approaches, new substances appear in the blood. Such an assumption seems to me unnecessary. Much more probable is the following explanation which I have given elsewhere (D. m. Wschr. 1937, p. 377): when the blood sugar deficiency is slight, develops slowly, and lasts only a short time, activity can still be maintained with the aid of the nutritional reserves within the cells. When the deficiency is great, develops rapidly, and lasts for a longer period, these reserves gradually disappear and at a certain point activity is of necessity suspended. First the instruments needed for more complex activity become usless, and finally unconsciousness sets in.

The results of our studies indicate that the essential manifestations of the hypoglycemic state—the psychic ones—are expressions of a general adynamia produced by blood sugar deficiency, and not of poisoning by insulin or adrenalin, or any other metabolic product. With this as a starting-point a simple explanation may be found for the beneficial effect of hypoglycemia on schizophrenia. One might conjecture that stripping the nerve cells daily of their internal reserves and the inevitable daily replacement of these reserves is the process by which the healthy tendencies of the cells gain power while the morbid elements lose their hold. This theory might also apply to the cardiazol therapy in which an utter depletion of the intracellular energy-producing reserves during the convulsion may be assumed.

34. THE NEW METHODS OF TREATMENT OF SCHIZOPHRENIA AND THE HOSPITAL ROUTINE

HANS ROEMER, ILLENAU-BADEN

First of all, let me deliver a message. Dr. H. Lehmann-Facius, Privat-docent, Frankfurt a. M., has asked me to express to you his regrets that it was impossible for him to give his address on the significance, in regard to differential diagnosis, of a new cerebrospinal fluid reaction (the brain lipoid reaction) in atypical psychoses. I also add my own sincere regret that we must be deprived of his paper. Since the new reaction, as it seems, will provide a serological test for schizophrenia and a physical symptom of this disease, such as the therapists desire, his paper would have claimed an eminently fitting place in our proceedings. I permit myself only the remark that this reaction which Lehmann-Facius first reported at the Annual Meeting of the Association of German Neurologists and Psychiatrists at Frankfurt a. M. in 1936 is being tested by Mr. Schneider in the laboratory of our institution, and the data obtained by him from an examination of about 200 spinal fluids seem to confirm the results of Dr. Lehmann-Facius. I may refer you to his original article in the Frankfurter Versammlungsbericht which has just appeared as a special volume of the Zschr. f. d. ges. N. u. Ps.

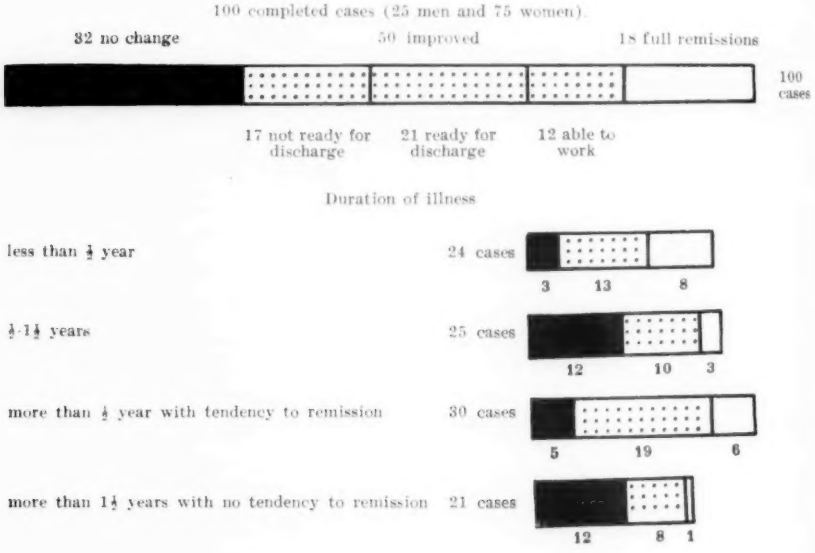
The studies of the insulin treatment in our institution since July, 1936, undertaken by Professor Küppers, at my suggestion, were reported by him in the Deutsche medicinische Wochenschrift of February 1937. In the interval up to May 15, 1937, completed treatments have risen from 34 to 100 (25 men and 75 women). To avoid making unnecessary demands on your time, I shall omit all discussion of the results of the treatment, since they show no essential differences from those previously reported in the recent Swiss statistics. The following chart portrays their essential points graphically.

In the spring of 1936, stimulated by the successes of Ederle and Hoffmann at Tübingen, I entrusted to Professor Küppers the task of trying out the insulin therapy. I was aware then that this task must affect the management of the hospital, and as we progressed to the point of establishing special insulin stations, it was clear to us that a considerable reorganization of the technical administration was inevitable.

The introduction of the insulin and cardiazol therapy requires first of all a suitable and numerically adequate staff of physicians and attendants.

The chief of the hospital on whom devolves the general responsibility must therefore make a very careful choice. Physicians who have become too skeptical through many years of practice and so

Results of the Insulin Treatment of Schizophrenia in Illenau from July 4, 1936, to May 15, 1937.



incline to a sort of therapeutic nihilism are as unfit to meet these problems as uncritical enthusiasts who do not yet possess the necessary acquaintance with general medicine or clinical experience with psychiatry. The personality of the physicians chosen must afford certainty that all rash and uncalled-for experimentation will be avoided. Such therapeutic studies can succeed only when they are begun and carried through with the devotion of the physician and the critical acumen of the scientist. At Illenau we have completed the course of treatment in 100 cases covering 5500 days of insulin injections and over 2000 episodes of coma without having to deplore the loss of a single patient. For this success we

have to thank the careful foresight with which Professor Küppers applied the rules of procedure provided by Sakel and worked them out with our personnel. But even though the carrying out of the method has become safer than it was at first, it is still not a casual routine the employment of which the physician may entrust to the nursing staff. It is obvious of course that a decision concerning the duration of each period of coma as well as the total length of the coma treatment requires the individual discrimination of the doctor in charge of the case.

The choice of a suitable personnel is not at all easy. The best men are just good enough. Even the senior members in charge can exercise the necessary supervision only after sufficient instruction and adequate experience.

It is recognized everywhere as fundamental that before the introduction of the new therapy the medical and nursing staff of the insulin department must spend some time making practical acquaintance with the new problems in an active service elsewhere.

Almost everywhere the activities of hospitals and asylums are modelled essentially to meet the needs of occupational therapy and, for the most part only to a modest extent, those of the fever treatment of paresis. At first the only way of introducing the new method is to cut down the medical and nursing staff on other services in order to release a sufficient force to carry the additional burden. The important task before the department of insulin therapy is a most careful supervision of the patients during the forenoon when they are being given insulin, and psychiatric treatment and guidance during the afternoon. We can only substantiate an observation made in various quarters that the psychiatric treatment during the insulin and cardiazol therapy is of great significance, that is perhaps not commonly recognized. The patients who are on the road to recovery must be brought into vital contact with reality by regulated periods of work, outdoor recreation, rhythmical gymnastics, mental stimulation, etc. Because of their great vulnerability at this time they must be shielded by prudent restriction of correspondence, visits and questioning, from harmful excesses in the demands made upon them with the consequent danger of relapse. Direct and indirect suggestion as it is usually practiced in institutions demands from these sensitive patients greatly increased activity and requires special caution.

When a more extensive introduction of the insulin therapy is contemplated, the establishment of two wards for each sex is inevitable, one for the fairly quiet patients, the other for the turbulent ones. Nevertheless the patients in these wards who are in different stages of treatment and improvement may disturb one another, so that it is best to transfer all well-progressed cases for the afternoon or for a few hours to the quiet ward or to private rooms.

The responsibility of the head of the institution requires that he, together with the physicians of the insulin wards, decide the choice of cases, the length of treatment and the type of treatment (combination or summation of insulin and cardiazol, etc.). In general the acute cases of less than a year's duration and those cases subject to acute exacerbations are the first to be given the treatment. Naturally the exclusion of a case or the interruption of an apparently unsuccessful treatment entails a great responsibility. The exchange of experiences at this meeting is a most valuable aid in setting up criteria along these lines. The head of the institution must also see that the method is applied uniformly and regularly in his institution, so that observations on the details of the treatment may be utilized to the fullest extent. The following comparative data show that the insulin treatment on the men's side, which was begun much later by my colleague Mr. Thumm, shows an average per capita duration which is nearly the same as that on the women's side where the method has been used since July 1936 and at first made relatively slow advances.

Average per capita duration of the treatment.....	25 men	75 women
Days with coma.....	20	21
Day with precomatose state.....	6	7
Other insulin days.....	23	28

It has been customary with us, for the chief of the hospital and the physicians in charge of the insulin wards, to visit and interview the inmates together every 2-4 weeks. At these rounds the exact written account of the findings was presented for further evaluation. With regard to our relations to the patient's relatives, a written agreement was regularly obtained from the family before either of the two new methods was used. In the interview with the relatives it is wise not to describe the prognosis as too good or the recovery as too quick, for the sake of guarding against later

disillusionment. On the psychotherapeutic grounds mentioned above, we must be very cautious with visits and leaves of absence. With discharged patients personal contact and correspondence must be kept up as far as possible, for only an exact catamnestic observation can make possible in the course of the following years a judgment concerning the permanency of the cure, a subject on which there is naturally nothing to say today. The outside service of hospitals and institutions is especially called upon to take the responsibility of a continued personal contact with the individual patients who have had remissions. They must watch for further improvement ("late ripening") as well as for possible relapse.

With regard to the cost of the insulin treatment, the expense can usually be recovered from paying patients. The public organizations (health insurance and welfare associations) in our communities are not prepared at once to bear these costs since the expense of the usual hospital treatment was previously included in the hospital rate. Recently, however, in Baden at the instance of the magistrates they have assumed the additional costs for insulin, etc., provided that the bill is submitted beforehand. For the hospital organization there is the extra expense due to additional laundry.

In connection with the introduction of the insulin and cardiazol treatment in Germany, the administrative departments as early as the autumn of 1936, on the basis of the experience which was then at hand, declared they were ready to entrust with this problem one institution in each section (province or county), as far as possible one that was equipped with suitable personnel, laboratories, etc.

Now that the new methods have proved their effectiveness, in my opinion, it can be only a matter of a short time before every hospital and institution with a fair number of admissions comprising acute cases, will introduce the new methods which will be desired also by the general public.

But since a goodly portion of the chronic cases is open to improvement extending to the possibility of discharge, the remaining large institutions will not be able to forego the method for long. With respect to the generally observed increase in admissions in institutions in recent years the government will no doubt take full advantage of the opportunity to reduce the number of hospitals required and will place at the disposal of the hospital boards the necessary personnel and material equipment.

In their transactions with the public the chiefs of hospitals and staff physicians will observe a certain reserve in order to avoid any injurious publicity and any disappointment on the part of the patients' families. On the other hand, in our experience appropriate attempts to instruct the practicing physicians are to be commended, above all the specialists in neurology and psychiatry, so that they may as early as possible send their patients in for hospital treatment.

As reports about the new successes spread, institutional psychiatry will exert an increased educational influence on young enthusiastic doctors so that for the future a lack of medical recruits need hardly be feared. In our experience even now volunteer doctors and others from private practice can be attracted to the insulin wards as assistants and there entrusted with the task of collecting and working over certain scientific observations.

The Swiss psychiatric association has performed a great service by making arrangements for this meeting. The numerous foreign participants are especially grateful. *By the consensus omnium, by the concordant findings of the many investigators from the different countries, the practical utility of the new methods of treatment of schizophrenia has been proved.* Thereby a secure basis has been laid down for the attitude to be taken by directors of hospitals toward the patients, their relatives, the people who meet the expense, the magistrates and the world at large. This success brings us a step nearer to the goal toward which we are all striving, to convert the asylum into a hospital in which we shall be able to restore to the mentally sick the art of living and the capacity for working.

35. RESULTS OF THE INSULIN SHOCK THERAPY IN SCHIZOPHRENIA

M. MARZYNSKI[1]

The psychiatric-neurological clinic in Wilno began to use the insulin therapy for schizophrenia in February 1934, a few months after the publication of the method and of the first results obtained with it in the Vienna clinic by the discoverer himself, Dr. M. Sakel.

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Up to April 10, 1937, we made use of this treatment on 164 patients. The manner of giving insulin underwent a number of modifications in the course of this time.

At first we followed Sakel's directions and gave the insulin 2-3 times a day to the same patient. When we learned later that the shock which exerts a salutary influence is most easily induced in the fasting state and that when insulin is given in the evening many dangerous shocks may occur at night, we began after six months to use insulin only once a day.

After the publication of Sakel's modified insulin therapy, which is based on grading the intensity of the hypoglycemia by the dose, in keeping with the type of psychosis to be treated, we adjusted our procedure to these new improvements. We received further instruction from Dr. Dussik, who visited our clinic and brought our procedure into conformity with that of the Vienna Clinic.

The entire material from the Wilno clinic is assembled in the tables. They have been compiled on the basis of the published works from our clinic. We must emphasize the fact that, for the purposes of the insulin treatment we have used the term schizophrenia in its broadest sense. Along with typical cases we have included all psychoses with schizophrenic features. Especially in very acute cases, often with a duration of only a few days or weeks, the diagnosis cannot be accepted undisputed.

We have divided all the cases, according to the duration of the illness, into three groups: 1) up to 6 months (Table I), 2) 7-12 months (Table II), 3) more than 12 months (Table III), 4) cases that have had psychoses once or more with remissions (Table IV).

The results of the treatment are designated as follows: Remission, lack of all manifestations of the disease and complete insight.

Great improvement, ability of the patient to return to work and reassume a place in society, but his inability to give a full account of the psychosis which he overcame. The patient believes, for example, but is not altogether sure that he has had delusions and false perceptions, or he explains his psychotic condition by saying that he did not speak because he had nothing to say or that he did not eat because he had no appetite. We speak of great improvement also about patients who show complete insight, and take up their former occupations competently, but whose nature has changed in

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TABLE I

DURATION OF ILLNESS, LESS THAN 6 MONTHS.

Explanation:
+++ = Remission
++ = Great improvement
+ = Slight improvement
R.o.w. = Remains on ward

Case	History No.	Name—Sex	Age	Ill for	Insulin therapy lasted: Days	Insulin therapy lasted: From–to	No. of injections	Dose in units: Maximum	Dose in units: First shock	Dose in units: Total	No. of shocks: Coma	No. of shocks: Convulsions	No. of: Hours of hypoglycemia	No. of: Hours of insulin	Results: Immed. after treatment	Results: At discharge	Results: Latest report	Improvement began after
1	2272	J.S. ♂	20	7 days	25	4/ 1/36– 4/24/36	9	152	136	1148	3	—	11	20	++	4/25/36 +++	8/ 4/36 +++	5 inject. progress
2	2270	C.P. ♂	28	7 "	53	4/ 4/36– 5/26/36	21	168	120	1855	12	—	22	54	○	7/11/36 ○	2/10/37 ○ 8/ 3/36 ○	
3	2129	S.M. ♀	20	½ months	62	10/ 8/35–12/ 9/35	26	250	—	3360	—	—	41½	69	+++	12/17/35 +++	7/ 2/36 +++ 2/ 5/37 +++	18 "
4	2207	S.I. ♀	23	½ "	60	1/16/36– 3/15/36	26	200	180	3510	15	—	28	53	○	–	R.o.w. ○	
5	2229	K.M. ♂	25	1 "	54	3/ 9/36– 5/ 1/36	21	304	140	3980	15	4	12	48	+	8/ 9/36 +++	3/ 3/37 ○	3 months after treatment +++
6	2249	Z.W. ♂	20	1 "	45	3/26/36– 5/ 9/36	17	176	88	2220	14	—	19	32½	++	7/ 1/36 ++	8/ 4/36 +++	14 Shocks
7	2491	B.A. ♂	44	1 "	45	12/29/36– 2/11/37	30	48	42	1046	25	20	54	94	+++	2/20/37 +++	3/24/37 +++	10 Shocks
8	2365	B.I. ♂	34	1½ "	64	7/ 9/36– 9/12/36	21	152	40	2776	13	8	33	55½	○	11/30/36 ○		
9	2506	K.I. ♀	18	1½ "	36	1/30/37– 3/ 6/37	24	60	60	920	19	3	28	53	+++	3/10/37 +++		3–4 Shocks
10	2399	P.K. ♂	36	1½ "	62	9/12/36–11/12/36	26	152	140	2872	16	10	34	75	○	11/14/36 ○	1/10/37 ○	
11	2503	M.J. ♂	23	1½ "	83	1/ 9/37– 2/11/37	26	66	54	1316	18	13	57	100	++	2/24/37 ++		1 Shock (7 inject.)
12	2417	K.S. ♀	40	2 "	67	9/12/36–11/17/36	30	90	70	2095	14	2	25	70	○	–	R.o.w. ○	
13	2192	S.K. ♂	24	2 "	72	2/ 6/36– 4/17/36	27	312	216	4740	12	5	26½	62	++	5/14/36 +++	7/ 4/36 ○	9–10 Shocks
14	2095	K.R. ♂	20	2 "	33	10/ 2/35–11/ 3/35	16	135	75	1490	10	4	23	33	○	4/24/36 +++	7/ 1/36 ++	2–3 weeks after treatment
15	2190	P.J. ♀	25	2 "	50	1/16/36– 3/ 5/36	22	140	120	3038	15	—	30	51	++	3/ 9/36 ++	7/ 1/36 ++	7–8 Shocks
16	2450	N.H. ♀	17	2 "	92	11/ 4/36– 2/ 3/37	64	100	90	4440	41	41	56	137	+++	2/ 5/37 +++	3/ 6/37 +++	20–22 Shocks
17	2478	H.J. ♀	26	2 "	38	1/ 7/37– 2/13/37	30	60	60	1760	18	2	29	64¾	+++	2/16/37 +++	3/ 6/37 +++	1 Shock progr.
18	2224	S.M. ♀	23	2 "	51	3/ 5/36– 4/24/36	23	130	108	2330	15	—	26	49	+	9/30/36 +++	10/12/36 +++	15 Shocks
19	2494	S.S. ♂	35	2 "	56	12/18/36– 2/11/37	29	64	64	1578	16	4	77	120	+++	2/17/37 +++	3/ 3/37 +++	9 Shocks
20	2175	G.I. ♂	29	2½ "	58	1/ 9/36– 3/ 6/36	21	140	100	2200	15	2	23	44	○	–	R.o.w. ○	
21	2360	S.M. ♂	25	2½ "	71	8/27/36–11/ 5/36	30	152	144	3490	18	16	36	74	○	12/22/36 +	3/10/37 ○	
22	2211	W.O. ♀	24	3 "	51	3/ 5/36– 4/24/36	24	130	80	2460	15	—	30	51	○	12/14/36 +		
23	2295	M.M. ♀	22	3 "	34	7/ 1/36– 8/ 3/36	14	80	50	865	12	6	16	35	○	9/12/36 ○	10/10/36 +	
24a	2221	D.M. ♀	29	3 "	37	3/ 5/36– 4/10/36	18	60	40	940	15	—	22	35	○			

TABLE I.—*Continued.*

Case	History No.	Name—Sex	Age	Ill for	Insulin therapy lasted: Days	Insulin therapy lasted: From–to	No. of injections	Dose in units: Maximum	Dose in units: First shock	Dose in units: Total	No. of shocks: Coma	No. of shocks: Convulsions	No. of: Hours of hypoglycemia	No. of: Hours of insulin	Results: Immed. after treatment	Results: At discharge	Results: Latest report	Improvement began after
24b	2221	D.M. ♀	29	months	32	5/ 9/36– 6/ 5/36	12	100	80	1150	12	8	14	36	○	6/19/36 ○		
25	2225	J.J. ♀	32	3 "	38	4/27/36– 6/ 2/36	16	220	140	2450	13	—	21	44	○	–	8/17/36 died gan	with pulm. grene
26	2103	P.J. ♀	25	4 "	39	9/ 9/35–10/17/35	23	150	120	2260	14	14	27	58	○	10/28/35 ○	7/ 3/36 ○	
27	2181	R.A. ♂	25	4 "	52	1/30/36– 3/21/36	20	128	82	2012	15	2	22	43½	++	4/ 6/36 ++	7/ 3/36 +++	4 Shocks
28	2202	B.S. ♂	27	4 "	52	1/30/36– 3/21/36	20	104	70	1780	16	2	26	44	○	7/ 2/36 ○	–	
29	2069	D.F. ♂	20	4 "	5	10/ 3/35–10/ 7/35	4	60	60	175	2	—	4	8	○	12/10/35 ○	7/ 6/36 +++	
30	2215	L.G. ♂	39	4 "	52	4/16/36– 6/ 6/36	20	152	120	2240	12	9	15	42	○	–	R.o.w. ○	
31	2162	P.C. ♀	24	4 "	51	3/ 5/36– 4/24/36	24	160	40	1780	16	—	22	45	+	6/19/36 ++	10/10/36 ++	2 Shocks
32	2291	L.Z. ♀	23	4 "	41	5/ 3/36– 6/12/36	16	200	120	2320	12	7	17	40	○	9/22/36 ○	10/12/36 ○	
33	2398	A.H. ♀	30	4 "	56	12/18/36– 2/11/37	37	120	110	3280	17	1	55	99	+++	1/12/37 +++	3/18/37 +++	11–12 Shocks
34	2464	A.A. ♂	16	4 "	90	1/ 4/37– 4/ 3/37	46	36	24	1350	36	10	88	141	○	–	R.o.w. ○	
35	2030	M.W. ♂	22	5 "	56	11/10/35– 2/ 4/36	21	124	68	1812	15	—	27	44	+	4/15/36 +++	7/ 3/36 ○	1–2 weeks after treatment
36	2031	S.S. ♂	48	5 "	39	11/ 5/35–12/12/35	16	60	35	840	15	—	22	33	○	3/ 2/36 +	7/ 2/36 ○	
37	2334	L.S. ♂	27	5 "	33	7/ 2/36– 8/ 3/36	13	56	40	504	10	—	23	38	○	11/30/36 +	–	
38	1965	K.F. ♀	31	5 "	38	9/ 8/35–10/17/35	24	160	120	2480	15	15	32	57	+++	7/20/35 +++	7/ 1/36 ○	4 Shocks
39	2235	R.A. ♀	24	5 "	35	4/29/36– 6/ 2/36	15	140	100	1780	12	12	21	38	+++	6/18/36 +++	–	4 Shocks
40	2441	A.W. ♀	33	5 "	92	11/ 3/36– 2/ 3/37	65	140	130	7090	41	7	100	170	+	2/16/37 ++	2/22/37 ○ (suicide)	35–38 Shocks
41	2112	A.S. ♂	27	6 "	72	9/26/35–12/ 6/35	25	170	10	3070	15	—	37	58	++	12/10/35 ++	Autumn 36 ○	7 Shocks
42	2432	W.M. ♀	28	6 "	90	10/26/36– 1/23/37	62	100	100	2510	32	3	44½	101	+++	1/29/37 +++	3/12/37 +++	25–28 Shocks
43	2445	B.D. ♂	23	6 "	48	12/ 3/36– 1/19/37	30	72	56	1848	24	6	58	97	+++	2/ 1/37 +++	3/12/37 +++	7–8 Shocks

TABLE II

DURATION OF ILLNESS, 7–12 MONTHS.

Explanation:
+++ = Remission
++ = Great improvement
+ = Slight improvement
R.o.w. = Remains on ward

Case	History No.	Name—Sex	Age	Ill for	Insulin therapy lasted: Days	Insulin therapy lasted: From-to	No. of injections	Dose in units: Maximum	Dose in units: First shock	Dose in units: Total	No. of shocks: Coma	No. of shocks: Convulsions	No. of: Hours of hypoglycemia	No. of: Hours of insulin	Results: Immed. after treatment	Results: At discharge	Results: Latest report	Improvement began after
44	2435	L.H. ♂	40	7 months	84	10/12/36– 1/ 2/37	44	60	60	1310	32	18	46	105	○	2/ 1/37 ○	3/30/37 ++	
45	2539	S.J. ♂	24	7 "	58	2/19/37– 3/17/37	17	80	80	1118	9	—	59	72	+++	3/22/37 +++		10 injections
46	2483	Z.A. ♂	38	7 "	90	12/ 3/36– 3/ 2/37	61	72	50	3408	36	23	135	220	○	—	R.o.w. ○	
47	2271	K.M. ♂	29	7 "	28	4/16/36– 5/14/36	11	104	56	968	11	—	16	35	+++	6/ 9/36 +++	3/ 9/37 ○	4–5 Shocks
48	2358	M.W. ♂	18	8 "	76	7/ 4/36– 9/18/36	26	216	170	2752	3	—	18	71	○	—	R.o.w. ○	
49	2017	K.S. ♂	28	8 "	106	10/ 3/35– 1/16/36	16	140	72	1400	1	—	21	40	+	2/ 2/36 +	6/ 9/36 +	
50	1829	J.A. ♀	34	8 "	50	5/12/34– 6/30/34	23	112	64	1546	9	—	18	44	○	7/25/34 ○	3/ 1/37 ++	
51	1061	C.D. ♂	23	8 "	28	5/ 5/34– 7/ 2/34	17	180	80	1770	9	—	20	47	○	7/19/34 ○		
52	2176	M.K. ♂	28	8 "	60	1/30/36– 3/30/36	23	168	108	2820	15	—	26	48	○	—	R.o.w. ○	
53	2187	K.K. ♀	33	8 "	58	1/16/36– 3/13/36	23	200	140	3090	13	—	27½	51	○	—	R.o.w. ○	
54	2457	N.P. ♀	37	8 "	93	11/18/36– 2/18/37	66	220	190	11410	23	5	147	201	○	—	R.o.w. ○	
55	2502	T.C. ♂	22	8½ "	88	1/ 5/37– 9/ 2/37	58	68	56	2776	47	30	120	209	○	—	R.o.w. +	
56	2179	G.J. ♂	23	9 "	48	2/20/35– 4/ 8/35	19	132	92	1804	10	10	22	53	+	4/11/35 +	8/ 5/35 ○	
57	2314	K.Z. ♀	33	9 "	39	6/ 5/36– 7/13/36	14	110	70	1105	12	—	21	36	○	7/31/36 ○	10/12/36 ++	
58	2527	G.N. ♂	25	10 "	46	6/13/36– 7/28/36	18	88	80	1008	12	3	27	53	+	11/ 4/36 ○		
59	2294	N.A. ♀	29	10 "	41	6/12/36– 7/22/36	16	160	70	1770	12	3	31	47	○	—	R.o.w. ○	
60	2305	B.O. ♀	40	10 "	123	11/18/36– 2/18/37	67	50	50	2195	46	46	90	171	+	—	R.o.w. +	
61	2474	S.E. ♂	22	11 "	97	11/ 9/36– 2/13/37	46	110	82	3258	32	22	70	158	+	3/ 9/37 +		
62	2151	S.B. ♂	21	12 "	48	4/ 8/36– 5/25/36	21	216	184	3464	12	2	18	47	+++	6/25/36 +++	8/ 7/36 +++	Progress from the 1st shock
63	2287	G.N. ♂	25	12 "	80	4/23/36– 7/11/36	39	144	136	3644	12	12	16	59	○	10/ 9/36 ○		
64	2281	S.A. ♂	23	12 "	58	4/16/36– 6/12/36	24	176	128	2412	11	8	19	61	+	7/ 3/36 +	7/ 5/36 +	
																	1/15/37 +	
65	2308	B.J. ♂	29	12 "	55	5/13/36– 7/ 7/36	26	264	144	4356	14	1	30	76	○	8/ 6/36 +	4/ 5/27 +++	
66	2276	B.S. ♂	23	12 "	66	4/28/36– 7/ 2/36	29	288	248	5262	12	5	40	77	+	8/13/36 ++	2/12/37 ++	Progress from the 1st shock
67	2333	W.J. ♂	38	12 "	37	6/12/36– 7/18/36	17	64	64	856	10	1	28	46	○	9/21/36 ○	2/15/37 ++	
68	2332	H.J. ♂	41	12 "	35	7/ 2/36– 8/ 5/36	14	112	56	976	10	3	21	42	○	10/10/36 ○		
69	2154	G.T. ♀	29	12 "	39	4/27/36– 6/ 4/36	17	200	140	2510	12	—	25	46	○	9/14/36 ○	10/12/36 ○	
70	2446	G.P. ♀	23	12 "	103	10/19/36– 1/30/37	68	110	100	2760	31	25	90	163	○	1/30/37 ○		

TABLE III

DURATION OF ILLNESS, MORE THAN 1 YEAR.

Explanation:
+++ = Remission
++ = Great improvement
+ = Slight improvement
R.o.w. = Remains on ward

Case	History No.	Name—Sex	Age	Ill for	Insulin therapy lasted: Days	Insulin therapy lasted: From-to	No. of injections	Dose in units: Maximum	Dose in units: First shock	Dose in units: Total	No. of shocks: Coma	No. of shocks: Convulsions	No. of: Hours of hypoglycemia	No. of: Hours of insulin	Results: Immed. after treatment	Results: At discharge	Results: Latest report	Improvement began after
1	2114	P.L. ♂	17	1 ½ years	94	11/ 5/35– 2/ 6/36	21	128	56	1960	18	3	31	50	+	2/12/36 +	5/15/36 ○	
2	1602	C.M. ♀	30	1 ½ "	35	11/13/34–12/17/34	16	110	40	1100	10	7	21	45	○	–	R.o.w.	
3	2007	S.T. ♀	35	1 ½ "	41	10/10/35–11/19/35	18	80	35	900	15	—	26	48	○	–	" ○	
4a	2012	R.J. ♂	17	1 ¼ "	92	9/10/35–12/10/35	39	270	200	6000	10	3	48	94	+	–	" ○	
4b	"	"	"	"	68	3/24/36– 5/30/36	26	288	264	5924	12	8	23	68	++	6/25/36 ++	2/ 5/37 ++	12 Shocks
5	2277	K.A. ♀	25	1 ¼ "	60	6/12/36– 8/10/36	24	280	110	3820	12	—	47	71	○	–	R.o.w. ○	
6	2014	P.K. ♂	23	1 ¾ "	51	11/18/36– 1/ 7/37	31	160	96	3354	20	11	66	119	○	–	" ○	
7	1361	B.J. ♂	30	1 ¾ "	41	4/ 6/34– 5/16/34	35	120	45	2387	13	—	40	79	++	6/20/34 ++	7/ 1/36 ++	13 Shocks
8	1484	K.M. ♀	32	2 "	51	5/ 4/34– 6/23/34	27	156	128	2568	2	—	19	54	○	–	R.o.w. ○	
9	1918	O.S. ♂	28	2 "	71	8/27/36–11/ 5/36	30	152	120	3608	14	16	51	80	○	–	" ○	
10	2193	H.A. ♂	28	2 "	81	2/19/36– 5/ 9/36	31	276	304	7210	13	5	27	75	○	8/ 3/36 ○	9/ 3/36 ○	
11	2477	K.S. ♂	31	2 "	27	11/16/36–12/12/36	18	80	76	1170	11	8	29	38 ½	+++	12/23/36 +++	3/18/37 ++	5–6 Shocks
12	2453	G.L. ♂	17	2 "	46	11/ 3/36–12/18/36	28	86	80	1970	13	6	40	75 ½	○	1/25/37 ○		
13	1212	F.M. ♂	19	2 ½ "	34	4/ 7/34– 5/10/34	4	20	20	80	2	—	6	10 ½	○	3/15/36 ○		
14	1601	B.F. ♀	19	3 "	42	4/22/34– 6/ 2/34	50	80	70	3142	14	9	40	100 ½	○	7/25/34 ○		
15	1137	G.A. ♀	36	3 "	78	4/10/34– 6/27/34	48	96	64	3722	14	14	30	115	○	–	R.o.w.	
16	2113	B.A. ♀	26	3 "	63	8/ 7/36–10/ 9/36	27	190	140	3660	16	7	47	83	○	–	" ○	
17	2325	D.P. ♂	28	3 "	50	6/12/36– 7/31/36	20	120	96	1768	12	—	35	63	○	10/19/36 ○		
18	1706	R.S. ♀	34	3 ½ "	40	11/ 3/35–12/12/35	17	70	30	878	15	—	21 ½	35	○	3/19/36 ○		
19	2316	C.C. ♂	33	4 "	55	6/12/36– 8/ 5/36	22	168	120	2248	10	—	37	67	○	8/29/36 ○		
20	2326	S.M. ♂	20	4 "	46	6/13/36– 7/28/36	20	128	104	2168	12	6	37	57	○	–	R.o.w.	
21	1732	K.W. ♂	23	4 "	43	5/ 1/36– 6/12/36	16	96	88	1270	10	5	24	41	○	–	" ○	
22a	1085	B.Z. ♂	34	4 "	54	5/ 1/34– 6/23/34	24	200	56	2312	10	—	27	42	○	–	"	
22b	"	"	"	"	56	2/20/35– 4/16/35	21	180	116	2044	13	—	24	39	○	–	"	
23	1836	K.Z. ♀	33	4 "	39	9/ 9/35–10/17/35	24	160	108	2540	15	—	32	63	○	–	"	
24	1331	K.A. ♂	26	4 "	48	5/ 6/36– 6/22/36	18	136	72	1624	12	—	25	43	○	–	"	
25	1092	P.N. ♀	37	5 "	58	3/ 8/34– 5/ 4/34	52	48	48	2314	10	—	29	110	○	–	" ○	
26	731	M.S. ♀	30	5 "	48	5/ 4/34– 6/20/34	28	144	112	2600	6	6	18	48	○	–	" ○	
27	2240	G.C. ♀	50	5 "	47	4/20/36– 6/ 5/36	21	230	180	3580	13	—	36	53	○	–	" ○	

TABLE III.—*Continued.*

Case	History No.	Name—Sex	Age	Ill for	Insulin therapy lasted: Days	Insulin therapy lasted: From–to	No. of injections	Dose in units: Maximum	Dose in units: First shock	Dose in units: Total	No. of shocks: Coma	No. of shocks: Convulsions	No. of: Hours of hypoglycemia	No. of: Hours of insulin	Results: Immed. after treatment	Results: At discharge	Results: Latest report	Improvement began after
28	1897	P.M. ♀	28	5 years	35	6/12/36– 7/16/36	15	100	70	1210	12	5	22	40	○	11/30/36 ○		
29	2292	G.S. ♂	27	5 "	49	4/21/36– 6/ 8/36	24	200	112	1394	12	—	30	54	○	—	R.o.w. ○	
30	232	M.E. ♂	31	5 "	52	4/18/36– 6/ 8/36	20	104	80	1616	13	2	16	42	○	—	" ○	
31	2280	G.J. ♂	40	5 "	76	4/16/36– 6/30/36	31	352	192	6250	12	4	36	80	○	7/ 9/36 ○		
32	454	M.L. ♀	34	5 "	48	5/ 3/36– 6/20/36	19	240	170	3200	12	1	38	59	○	—	R.o.w. ○	
33	2262	J.K. ♂	34	6 "	34	5/ 6/36– 6/ 8/36	15	56	56	778	12	1	24	41	○	—	" ○○○	
34	520	L.A. ♀	31	6 "	35	11/13/34–12/17/34	16	90	40	1160	13	—	28	45	○	—	" ○	
35	1063	N.J. ♂	28	6 "	38	4/12/34– 5/19/34	23	80	36	1130	12	7	19	50	○	8/20/34 +	7/ 4/34 ○	
36	2227	S.J. ♀	26	6 "	42	3/ 5/36– 4/15/36	19	110	48	1270	15	—	21	46	○	9/20/36 ○		
37	1411	G.A. ♀	42	6 "	37	4/29/36– 6/ 4/36	16	160	120	2090	14	—	34	57	○	12/12/36		
38	1023	S.J. ♀	32	6 "	69	6/12/36– 8/19/36	26	280	200	4860	12	10	41	79	○	9/ 4/36 ○		
39	2260	M.E. ♂	31	6 "	61	4/ 7/36– 6/ 6/36	19	96	56	1412	14	3	26	47	○	9/14/36 ○		
40	2509	R.J. ♂	26	6 "	67	1/13/37– 3/20/37	52	100	60	3976	38	7	183	215	○	—	R.o.w. ○	
41	2284	Z.J. ♂	40	7 "	36	6/13/36– 7/18/36	16	80	80	1136	10	—	30½	46	○	9/15/36 ○		
42	1623	P.W. ♂	23	7 "	56	4/ 1/36– 5/26/36	19	104	88	1584	13	—	24	40	○	—	R.o.w. ○	
43	1461	G.E. ♂	28	7 "	48	5/14/36– 6/30/36	20	168	112	2384	13	5	26	50	○	—	" ○	
44a	1429	M.K. ♂	26	7 "	71	4/12/34– 6/21/34	42	200	30	3746	12	—	50	95	○	—	" ○○○	
44b	"	" "	"	"	76	2/10/36– 4/25/36	29	368	208	5858	14	1	28	75	○	—	" ○	
45	2248	R.C. ♀	28	7 "	51	4/29/36– 6/18/36	20	280	180	3640	12	2	40	60	○	6/24/36 ○		
46	2233	G.J. ♀	28	7 "	73	3/26/36– 6/ 2/36	28	200	180	4180	17	10	39	71½	+	6/ 3/36 +	2/15/37 ++	
47	1940	M.J. ♂	29	7 "	77	3/24/36– 6/ 8/36	23	272	176	4242	12	2	22	55	○	—	R.o.w. ○	
48	1883	K.A. ♂	28	8 "	49	3/26/36– 5/13/36	18	152	120	2340	14	1	19	40	○	—	" ○	
49	1575	C.J. ♂	24	8 "	44	4/ 9/34– 5/22/34	39	180	—	3093			26	97	○	11/ 8/34 ○		
50	2168	P.J. ♂	30	8 "	64	1/30/36– 4/ 2/36	25	170	72	3870	15	1	34	54	○	—	R.o.w. ○	
51	1629	B.M. ♀	38	8 "	61	6/18/36– 8/17/36	26	270	30	4660	12	—	5	81	○	—	" ○○○	
52	322	K.E. ♂	22	9 "	57	4/21/36– 6/16/36	15	120	40	1140	10	1	21	37	○	—	" ○	
53	941	D.A. ♂	34	9 "	47	6/12/36– 7/28/36	16	52	40	652	12	3	25	37	○	—		
54a	2217	S.J. ♂	22	10 "	61	1/30/36– 3/30/36	23	232	80	3050	15	—	22	53	○	—		
54b	"	" "	"	"	82	4/28/36– 7/18/36	30	168	168	3696	12	2	45	80	○	—	R.o.w. ○	
55	2205	S.J. ♂	22	10 "	65	1/20/36– 3/24/36	20	88	72	1560	16	5	26	42	○	9/15/36 ○	3/19/37 ○	
56	1992	F.M. ♂	30	10 "	70	11/22/35– 1/30/36	39	392	174	8514	15	1	47	97	○	4/20/36 ○		
57	1422	J.J. ♂	47	20 "	54	10/ 4/35–11/26/35	19	80	55	1390	15	10	21½	41	○	—	R.o.w. ○	

REMISSIONS.

Explanation:
+++ = Remission

TABLE IV

REMISSIONS.

Explanation:
+++ = Remission
++ = Great improvement
+ = Slight improvement
R.o.w. = Remains on ward

Case	History No.	Name—Sex	Age	Time since first illness	Spontaneous remissions before insulin treatment: No.	Spontaneous remissions before insulin treatment: Duration	Duration of present relapse	Insulin therapy lasted: Days	Insulin therapy lasted: From–to	No. of injections	Dose in Units: Maximum	Dose in Units: First shock	Dose in Units: Total	No. of shocks: Coma	No. of shocks: Convulsions	No. of: Hours of hypoglycemia	No. of: Hours of insulin	Results: Immed. after treatment	Results: At discharge	Results: Latest report	Improvement began after
1	2138	L.M. ♀	26	1½ years	1	6 months ++	5 months	60	1/ 9/36–3/ 9/36	24	220	108	3276	15	—	32	50	+	4/ 6/36 ○		
2	2166	G.D. ♀	26	2 "	1	7 months +++	10 "	76	1/ 9/36–3/25/36	27	340	340	6910	10	—	37	62	+	4/22/36 +	7/ 4/36 +	
3	2179	G.J. ♂	23	2 "	1	2 months ++	6 "	65	1/30/36–4/ 4/36	26	240	160	3784	13	6	24	55	+++	4/ 5/36 +++	8/ 5/36 ○	7 injections
4	2141	S.A. ♀	32	2 "	1	8 months +++	11 "	95	11/24/35–2/27/36	29	300	300	4238	14	—	36	58	+		R.o.w. ○	
5	2309	Z.M. ♂	29	2 "	Often	2 days to ++ +++	?	49	5/16/36–7/ 2/36	18	136	128	2040	12	8	19½	41	+	8/17/36 ++	3/13/37 +++	8–9 Shocks
6	2112	A.S. ♂	29	2 "	1	9 months ++	6 "	13	3/ 3/37–3/17/37	11	82	48	558	7	2	37	45	+++	4/ 4/37 +++		3 Shocks
7	2226	B.H. ♀	30	2 "	1	13 months	4 "	37	4/22/36–6/ 2/36	16	100	80	1480	14	14	22	33	○	10/27/36 ○		
8	1799	S.A. ♂	23	2 "	1	8 months ++	5 "	55	2/20/35–4/16/35	21	200	140	2108	1	—	25	50	+	8/19/35 +	7/ 1/36 ○	
9	1536	W.G. ♀	19	2¼ "	1	1½ years +++	6 "	49	9/10/35–10/28/35	26	220	90	2910	15	1	21	64	○	4/ 4/36 ○	7/ 2/36 ○	
10	2099	S.J. ♂	24	3 "	2	2 months ++ 6 weeks +	1 "	51	9/13/35–11/ 3/35	26	135	135	2430	14	3	39	52	++	11/ 9/35 ++	6/ 9/36 ++	10 Shocks
11	2029	N.W. ♀	26	3 "	1	2¼ years ++	10 "	61	1/ 9/36–3/11/36	28	320	300	5378	9	—	40	70	++	3/25/36 ++	May 1936 +	2–3 Shocks
12	2274	C.N. ♀	20	3 "	1	2¾ years +++	2 "	39	4/27/36–6/ 4/36	17	200	140	2570	12	—	20	45	+++	7/28/36 +++	4/ 8/37 +++	4 Shocks
13	2256	G.F. ♀	34	3 "	1	2 months +++	9 "	41	4/23/36–6/ 2/36	18	200	140	2580	12	3	28	50	+	6/ 9/36 +	3/20/36 ○	
14	2298	K.J. ♀	26	3 "	1	3 months +++	8 "	35	7/ 6/36–8/10/36	15	110	80	1260	12	—	24	41	+	10/14/36 +++		
15	2109	S.H. ♂	29	3 "	1	2½ years +++	4 "	30	1/ 8/36–2/ 6/36	13	128	120	1160	5	—	16	28	+++	2/13/36 +++	7/ 2/36 ○	6 inject. without deep shock
16	1761	D.S. ♀	23	3 "	1	2 months ++	8 "	80	11/21/35–2/ 9/36	31	240	108	4000	15	—	42	82	○		R.o.w. ○	
17	2231	R.J. ♂	30	3½ "	1	2 months ++	1 year	45	6/19/36–8/ 3/36	20	168	120	2124	12	—	37	61	+	10/13/36 +		
18	1488	S.A. ♀	36	4 "	3	2 months ++	5 months	40	10/10/35–11/19/35	18	60	30	808	15	—	32	38	+	11/29/35 +	6/16/36 ○	

TABLE IV.—*Continued.*

Case	History No.	Name—Sex	Age	Time since first illness	Spontaneous remissions before insulin treatment: No.	Spontaneous remissions before insulin treatment: Duration	Duration of present relapse	Insulin therapy lasted: Days	Insulin therapy lasted: From–to	No. of injections	Dose in Units: Maximum	Dose in Units: First shock	Dose in Units: Total	No. of shocks: Coma	No. of shocks: Convulsions	No. of: Hours of hypoglycemia	No. of: Hours of insulin	Results: Immed. after treatment	Results: At discharge	Results: Latest report	Improvement began after
19	1412	B.I. ♀	27	4 years	6	2 weeks to 2 months	2 months	47	9/ 9/35–10/25/35	26	180	120	2908	15	—	32	66	+	10/31/35 +	R.o.w. ○	
20	1430	M.I. ♂	20	5 "	Often	3–9 months +–++	4 "	69	1/11/36–3/30/36	29	144	100	3265	19	4	32	64½	+	4/ 1/36 +	7/ 6/35 ++	
21	2180	M.A. ♂	22	5 "	2	2 days ++ 3 months ++	1½ years	50	4/17/36–6/ 6/36	21	176	96	2224	12	—	29	52	○	9/16/36 ○		
22	2147	G.A. ♂	27	5 "	1	3½ years ++	4 months	55	1/28/36–3/22/36	21	70	66	1250	18	2	30	48	○	6/21/36 ○	3/15/37 ○	
23	2317	K.Z. ♀	23	5 "	1	4 years +–++	6 "	35	7/ 3/36–8/ 7/36	15	120	60	1240	12	7	17	40	○		R.o.w. ○	
24	1443	M.I. ♀	22	5 "	1	9 months ++	4 years	66	10/ 8/35–12/12/35	29	170	140	3260	14	—	24	65	○		1/15/37	Died with purulent enteritis
25	2261	S.W. ♂	25	5 "	2	7 months and 3½ years +++	3 months	34	5/ 6/36–6/ 8/36	13	80	56	752	10	5	18	31	+	9/15/36 ++		6 Shocks
26	2355	K.S. ♂	34	6 "	3	2 years ++ to +++	7 "	50	8/25/36–10/21/36	23	152	92	2666	16	—	42	60	++	3/ 1/37 +++		9 Shocks
27	1193	Z.J. ♂	32	8 "	Often	2 weeks to a month +–+++	3 years	51	6/13/36–8/ 3/36	21	136	112	2132	12	1	40	63	○		R.o.w. ○	
28	2252	B.H. ♀	26	8 "	2	6 months ++ 6 months +	4 "	41	4/15/36–6/ 4/36	22	240	180	3460	12	5	19	62	○	9/15/36 ○		
29	1723	C.M. ♀	38	8 "	2	3 months ++ 1 month +	4 "	36	6/12/36–7/17/36	15	90	70	1120	12	12	21	40	○		R.o.w. ○	
30	2000	J.S. ♂	38	9 "	2	4 years and 4 years +++	5 "	68	9/12/35–11/10/35	30	200	135	3610	13	—	40	65	○	12/17/35 ○	1/ 1/37 ++	
31	2421	N.S. ♂	30	10 "	3	1 year +++ 6 years +++ 1½ years +++	4 months	32	10/23/36–11/24/36	17	120	110	1336	9	—	26	46	+++	12/ 1/36 +++		7 inject. without deep shock
32	2189	L.M. ♂	39	10 "	Often	2 weeks to 2 months	7 "	44	4/22/36–6/ 6/36	16	104	96	1448	12	1	16	34	○		R.o.w. ○	
33	2366	P.P. ♂	34	12 "	2	2 years +++	5 "	35	11/18/36–12/22/36	22	60	60	1160	17	7	39	54	++	1/ 5/37 ++	3/ 6/37 ++	8 Shocks
34	2299	T.P. ♀	28	12 "	1	11½ years +++	4 "	36	6/22/36–7/27/36	14	240	240	1830	1	—	24	43	○	7/29/36 ○		
35	1635	W.H. ♀	33	12 "	2	4 months and 12 months +++	6 "	62	4/28/34–6/28/34	42	64	48	2308	15	12	30	66	○	12/18/36 ++		2 years after treatment
36	2546	R.L. ♂	28	14 "	1	1 month +++	1½ "	13	2/22/37–3/ 6/37	10	52	52	486	8	5	25	33	+++		R.o.w. ○	2 injec. Relapse 4 weeks after treatment
37	2275	K.S. ♂	31	15 "	2	12 years ++ 1½ years +++	1 "	91	4/ 1/36–6/30/36	20	104	80	1482	13	—	25	53	○	7/18/36 ○	8/ 3/36 ○	

comparison with their previous condition. It must be pointed out that in many cases a narrow line cannot be drawn between remission and great improvement and often subjective factors play a great role in making the decision.

By slight improvement we mean that in the course of the disease only single symptoms have passed away or become less intense.

As may be seen, we are very strict in interpreting our results. The later data are to a great extent founded on the statements of the magistrates or of the families of the patients.

In the adjoining tables we have collected all the details of the treatment as applied to each case.

In assembling the results of the treatment we depend on the condition of the patients on the day of their discharge from the clinic and regard as significant only remissions and great improvements. We do not take into account slight improvements. They are often difficult to grasp and not safe to evaluate. Often they turn out to be only a transference of the psychosis to a new and more social form.

Table I includes all cases with an illness of 1-6 months' duration. Among 43 such cases there were on the day of discharge 17 remissions and 7 great improvements, a total of 24 cases, making 55.8% positive results.

Table II includes cases with an illness of 7-12 months. Among 27 such cases there were on the day of discharge 3 remissions and 1 great improvement.

Table III includes cases whose illness has continued without improvement for more than a year. Among 57 such cases we had 1 remission and 2 great improvements.

Besides the cases recorded in Tables I, II, and III, we treated also 37 patients with histories of previous spontaneous remissions. These cases are reported in Table IV. We see from it that we obtained on the day of discharge 7 remissions and 6 great improvements.

Among the 164 cases 20 were treated according to the method recently advised by Sakel. These cases were taken from Tables I and II and collected in Table V. From it we see that out of 12 patients whose illness had lasted 1-6 months we obtained remissions in 8 and great improvements in 2; and out of 8 patients with ill-

nesses of 7-12 months' duration we obtained, in spite of Sakel's new modification, only one remission in a patient whose later fate is not known.

Summary

In evaluating our results with the insulin therapy we excluded all cases with a tendency to remission, since we did not know whether the improvement was a result of the treatment or would have occurred spontaneously.

TABLE V.

Case	Taken from Table	Ill for	Results of treatment		
			At once	On the day of discharge	Latest report
1	I. No. 7	1 month	+++	2/20/37 +++	3/24/37 +++
2	I. No. 9	1½ months	+++	3/10/37 +++	No report
3	I. No. 11	1½ "	++	2/24/37 ++	" "
4	I. No. 12	2 "	○	——	R.o.w. ○
5	I. No. 16	2 "	+++	2/ 5/37 +++	3/ 6/37 +++
6	I. No. 17	2 "	+++	2/16/37 +++	3/ 6/37 +++
7	I. No. 19	2 "	+++	2/17/37 +++	3/ 3/37 +++
8	I. No. 33	4 "	+++	1/12/37 +++	3/18/37 +++
9	I. No. 34	4 "	○	——	R.o.w. ○
10	I. No. 40	5 "	+	2/16/37 ++	2/22/37 ○
11	I. No. 42	6 "	+++	1/29/37 +++	3/12/37 +++
12	I. No. 43	6 "	+++	2/ 1/37 +++	3/12/37 +++
13	II. No. 44	7 "	○	2/ 1/37 ○	3/30/37 ++
14	II. No. 45	7 "	+++	3/22/37 +++	No report
15	II. No. 46	7 "	○	——	R.o.w. ○
16	II. No. 54	8 "	○	——	" ○
17	II. No. 55	8½ "	○	——	" +
18	II. No. 60	10 "	+	——	" +
19	II. No. 61	11 "	+	3/ 9/36 +	No report
20	II. No. 70	12 "	○	1/31/37 ○	" "

After the exclusion of this group there remained 127 cases.

In our first reports from the Wilno clinic we grouped as acute cases illnesses lasting from 1-12 months. Later we became convinced that a 6-months' duration constitutes a very good dividing line with respect to prognosis. Thus we obtained a clear picture by separating the cases of 1-6 months' duration from those of 7-12 months, as Sakel and Dussik had done. This classification was already introduced by Borysowicz and Witek in the comprehensive work published from our clinic in January 1937; it was evidently overlooked by M. Müller in his Insulin and Cardiazol Shock Therapy of Schizophrenia.

The results so far obtained with insulin therapy as seen on the day of discharge from our clinic are put together here:

Duration of illness	No. cases treated	Remissions	Great improvement	Slight improvement	Negative cases	Total No. of remissions and great improvement
1– 6 months....	43	17	7	4	15	24 = 55.8%
7–12 months....	27	3	1	7	16	4 = 14.8%
Over 1 year.....	57	1	2	3	51	3 = 5.2%

This table shows that when the disease has lasted over a year, the chance of a cure is slight, scarcely 5.2%. Likewise the percentage of good results in cases of 7-12 months' duration is far behind that seen in very recent cases, and amounts to 14.8%.

In cases of 1-6 months' duration our results may be considered as promising, since we had on the day of discharge 55.8% remissions and great improvements. According to the latest findings, this percentage is now lower, amounting to 41.8%.

In 12 cases of 1-6 months' duration of illness, which were treated with Sakel's latest methods the results are much more favorable. On the day of discharge from the clinic the treatment had been successful in 10 of the 12. Unfortunately we have too small a number of cases to be able to draw valid conclusions. It is difficult also to avoid errors in evaluating the results, as one of these 12 cases shows. The patient, A. W., after careful examination was discharged from the clinic as greatly improved. At home her condition at once grew worse so that she committed suicide on the sixth day. When we consider that with 12 cases, 1 makes a difference of about 10%, we may easily see how illusory percentages can be when the number of cases studied is small.

Moreover, I heard before my departure that still another of these 10 cases had suffered a relapse so that only 8 of the 10 remissions now remain in remission.

In 8 cases of 7-12 months' duration of illness we succeeded in obtaining only one remission in spite of using Sakel's new modifications.

This poor result which contrasts so sharply with that obtained in the cases of 1-6 months indicates that an illness of 6 months constitutes an important dividing line with respect to the effectiveness of the insulin therapy, for, regardless of the particular method used,

the percentage of remissions and good improvements falls off sharply as the duration of the illness exceeds 6 months.

Our present data which include 127 cases without relapse are insufficient, since for establishing percentages at least 400 are required.

The phase in the insulin therapy at which improvement begins is difficult to locate since, like Sakel, we have not employed one and the same method since the beginning. Observations made in our clinic have taught us that improvement may start at different periods of the treatment. Most frequently it is met with in the first 3 or 4 weeks, often after only a few shocks.

The perils of large doses of insulin, at first so strongly emphasized, have been shown to be very slight when suitable precautions are taken. In our clinic we have not had a single death as a result of the insulin treatment.

We have been treating with insulin since February 1934 all cases of acute schizophrenia and conditions suggesting schizophrenia. The catamneses will show us in the future to what extent other psychoses were to be found among the treated cases, the diagnosis of which could not be definitely established because of the short period of observation, amounting often only to days or a few weeks. These factors must be faced in the final evaluation of the effectiveness of the insulin therapy. We must likewise keep in mind the fact that acute schizophrenia and conditions suggesting schizophrenia show a great tendency to spontaneous remissions and improvements.

Accordingly, no final conclusions concerning the degree of effectiveness of the insulin therapy can be drawn without a comparison of abundant material comprising both treated and untreated cases. The frequency of spontaneous remissions in schizophrenia and maladies of schizophrenic character is sufficiently demonstrated by our past material. Of 164 treated cases we found no less than 37 which had in their earlier course undergone spontaneous remissions.

36. REMISSIONS AFTER THE INSULIN TREATMENT

By M. L. PRESS[1]

Contribution to the Problem of Remissions in Schizophrenia

The insulin treatment of schizophrenia according to the method of Sakel was introduced in the psychiatric clinic at Zurich in May, 1936.

Thirty-six patients—29 women and 7 men—were treated up to the first of April, 1937.

These 36 patients are subdivided as follows:

4 with catatonic stupor, 3 of whom have social remissions, and 1 is slightly improved.

14 with catatonic agitation, of whom 4 have social remissions, 1 is very much improved, 1 slightly improved and 8 remain unchanged.

13 hebephrenics of whom 3 have social remissions, 1 is much improved, 4 are improved at varied degrees, 5 remain unchanged.

4 paranoids of whom 2 are slightly improved, and 2 remain unchanged.

1 case of status epilepticus in a twilight condition which may be considered as medically cured.

Our division into social remission, improvement, and unchanged condition corresponds to that proposed by Müller; our notion of "social remission" differs, however, from the definition of "full remission" as given by Müller in the sense that in no one of our patients in social remission could we observe a complete restitution of the affective rapport and of its capacity for modulation, nor could we observe full insight into the malady. These two essential points of a remission were only partially obtained. With these reservations, if we combine the percentage of social remissions with that of good remissions (according to Sakel) we obtain a total of 33.3% against 22.1% of improvements at varied degrees and 41.6% of cases which remained unchanged. We emphasize the

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fact that these percentages, insofar as they are derived from a number of cases much below 100, have only a very relative value and on the whole have only the merit of allowing us a better general survey of our material.

Let us now consider our material from the standpoint of the duration of the illness:

1. 12 cases in which the duration of the illness was less than one year and all of them in their first attack. Out of these twelve cases we obtained social remission in eight, great improvement in one, and no changes in three (in percentages, 75% social remissions against 25% of cases without change).

2. In 22 cases, duration of the illness was for more than one year and up to more than ten years. Out of these we obtained only two social remissions, eight improvements of varied degrees and no change in eleven cases (in percentages, 13.5% social remissions, 13.25% relative improvements, and no change in 50%).

3. Thus these figures in accordance with other statistics prove the efficacy of the method insofar as it is applied to patients who are in their first attack and in whom the illness is of no longer than one year's duration. In cases of more than one year's duration the results fall to a very low average.

If we take into consideration the duration of the attack without being concerned with the total duration of the sickness we again obtain very different figures:

1. Attack lasting up to nine months: twenty cases out of which ten were social remissions, one good improvement, four relative improvements and five cases without any change (in percentages, 55% social remissions and good improvements, 20% relative improvements and 25% stationary conditions). We note the exact parallelism with the duration of the illness up to one year.

But when we consider cases in which the duration of the attack lasts longer than nine months, the percentage falls considerably:

2. Out of 15 cases only one improves remarkably, four improve to varied degrees, and ten remain without change (in percentages, good improvements 6.6%; fair improvements, 26.6%, and no change in 66.6%).

With our small material, we could not take into consideration the number of attacks. We only want to point out in this respect that one of our patients who already had three spontaneous re-

missions in the course of her illness for five years also made a remission with the insulin treatment, which was to be expected.

The figures which we have just reported lead us to the following considerations:

1. A remission is directly related to the total duration of the illness and to the duration of the acute crisis. The longer the illness, and the longer the crisis, the less will be the tendency to the remission. Thus the most favorable results with the insulin treatment will be obtained—as shown by statistics which have appeared heretofore—in cases which are in their first attack and in which the total duration of the illness is below one year.

2. It has been long known that the most favorable period for a spontaneous remission is also to be found in the same time limits, regardless of the number of the acute attacks, wherein lies the difficulty in evaluating the part of the treatment in the remission. What we can state with some certainty according to the observations of our clinic, is that the treatment has not produced the remission but it advanced or helped to bring into being a remission which was coming spontaneously. Each time when we tried to abort an attack at its onset we invariably failed. This leads us to believe that the most favorable time for the beginning of the insulin therapy is when the duration of the illness is not longer than a year and when the illness is not in its most acute phase.

This at least was the case with our material: out of twelve social remissions and good improvements, seven were obtained in the course of the treatment carried out between the fifth and eighth month of duration of the attack; only four improvements when the treatment was given before the fifth month; only one case in the tenth month of the attack showed a good improvement.

In ten out of the twelve cases we made a favorable prognosis; that is, we expected a spontaneous remission within the time limits previously mentioned. That the remission was helped by the treatment we do not doubt, but we could not assert that it was due only to the treatment.

3. Our results are in disagreement with those of other clinics in the sense that our best results were obtained almost exclusively in patients with catatonic stupor and catatonic agitation. Thus out of a total of eighteen catatonics we obtained seven social remissions, whereas out of a total of thirteen hebephrenics we obtained

only four remissions. As to four paranoid patients treated, we obtained deceiving results; the duration of the attack was ten months, one year, and longer. It was nevertheless interesting to try out the treatment in full-fledged paranoid patients to find out its complete inefficacy.

4. Even cases which are not influenced by the treatment also furnish interesting observations. Out of our fifteen cases which remained unchanged in spite of the treatment, there are three which we tried to treat at the very onset of the attack. These are three catatonics, very agitated.

In two of them we begin the treatment after 15 days of observation; after three weeks the agitation yields to a stuporous catatonic state which in the two patients turned into hebephrenia of a chronic character. Would the illness have followed the same course without treatment? It looks as if the treatment interfered with a rapid overflowing and thus the overflow followed its course smoothly. The third patient, catatonic in extreme agitation and aggressive, eight days after her admission had the sleep treatment after which she was free from hallucinations, well-ordered, and in good affective rapport, but only for one day. The next day she relapsed. Then 6 weeks after her admission we began the insulin treatment. After the first treatments in which coma was provoked, the patient became quiet for a few hours but the hallucinations and the delirium, while a little attenuated, remained constant. After seven weeks of fruitless treatment we stopped it. We have the distinct impression that the condition of the patient remains acute and that no treatment will be able to influence the course of the illness.

Why such a failure in three cases treated at the very beginning of the illness? In these three patients, the crisis came to the fore suddenly. If the treatment were really a specific one then it would be capable of arresting the crisis. It is possible that there was some fault in the technique or a lack of intuition in finding the propitious moment for establishing contact with the patient. Here is the case of another patient who in spite of the insulin treatment which was carried out for 3 months and failed, had a good remission later on without any special psychotherapy. We are dealing with a young woman 30 years old who was hebephrenic for 2 years. She was an inmate of an asylum of a neighboring canton because of repeated

suicidal attempts in November 1935. She came to us in February 1936, completely autistic, dominated by a feeling of depersonalization, of culpability, of being reduced to nothingness and having numerous hallucinations of a sexual character. The insulin treatment began in October 1936 and was terminated at the beginning of January 1937 without beneficial results. The patient's condition remained the same, but at the end of April a notable change in the attitude of the patient was observed. She became more approachable; she smiled, showed interest in the environment and felt as if she were relieved from a heavy load. Her ideas of suicide disappeared, and at the end of May she was permitted to go home. Should we credit insulin with this amelioration? For my part I cannot admit it.

5. We had the occasion to admit to our clinic a few patients who relapsed. These patients had the insulin treatment a few months previously. The improvement obtained permitted the patients to go back to their families; yet when they came to our clinic they presented the same symptoms which they had at the beginning of the illness. The impression is that in certain cases the illness was repressed by the treatment, then under the slightest external shock it reappeared at the same phase of development as before the treatment.

Thus the results which we obtained were not as satisfactory as we expected. Is this due to the choice of our material? This is true to a certain extent. In choosing our cases we were guided by the desire to use the treatment in serious difficult cases of schizophrenia—in patients in whom the illness showed a tendency to chronic development. In most of these cases the insulin treatment was ineffective. That is why it seems to us that it is premature to talk of a specific treatment for schizophrenia. Insulin has beneficial effects only in certain conditions and in a limited number of patients.

Who are these patients and what is the quality of the remission? I cannot answer the question but I shall cite three examples which are very different from each other, and of some interest:

1. Marthe R., 38 years old, an inmate in our hospital for the second time. Diagnosis: Catatonia. Prognosis for the attack: good. Marthe R. has numerous delirious ideas and hallucinations. Among other things she believes she has a tapeworm; she feels that it is

moving from the stomach to the throat to bite her. This is the cause of her anxiety, of not eating, and sleeping poorly. The whole night she strikes herself violently in the hope of killing her parasite. One month and a half after her admission we begin the insulin therapy. A few days later the patient announces that her tapeworm will soon be killed, thanks to the injections. Then after she came out from an epileptiform crisis between comas two weeks later she corrects her previous statement as follows: From the very beginning of the treatment her appetite came back. This evoked her first suspicion of the reality of the parasite. The parasite, nourishing itself with the food which the patient absorbs, would be expected to interfere with her gaining weight. Since she is hungry and continues to gain weight, it is an obvious sign that the parasite does not exist. The patient adds spontaneously "I was mistaken; it was an illusion." This explanation, entirely rational, of hallucinations, does not appear to be the rule in the course of the insulin treatment. In most cases such an explanation appears to be made suddenly, the patients being unable to explain what was the matter with them. They came out from coma with a feeling of relief. Several patients remarked that the treatment was like a re-birth, like an awakening after a terrible dream. This finds illustration in the following example.

2. Claire D., 24 years old, was sent to us in 1935 because of a sudden and violent attack of agitation. After a few days the agitation was replaced by stupor, with mutism, negativism, lack of taking care of herself and sometimes explosive crises which necessitated keeping the patient in a division for agitated patients. This condition in spite of the sleep treatment carried out in February 1936 remains unchanged until the beginning of the insulin treatment in May 1936. After the seventh day of treatment the patient begins to talk. She claims not to have any recollection of what has taken place and up to the nineteenth treatment with coma she is pleased to remain in an infantile state, behaves as if she were a child 5 years old and eats voraciously everything that she can lay her hands on. All the attempts to stimulate her interest in anything remain fruitless. On the day of the nineteenth coma the patient at her awakening hears the doctor talking to a nurse about tennis. The physician was suddenly astonished to hear a normal voice of a young girl: "Fräulein Doctor, I also play tennis. Would you like

to play also once with me?" The next day there was the amusing spectacle of the young girl who for six months remained inert, tasting life again, playing vivaciously. At the beginning of the play the patient has moments of hestitation, suddenly stops and excuses herself by saying: "You know, Fräulein Doctor, my thoughts are not yet altogether organized." Then spontaneously she begins to talk of her life and of the beginning of her sickness. From this day on the patient makes rapid progress, the affective rapport becomes better every day and Claire soon quits the clinic in a slightly hypomanic state which reflects her joy to live again. As concerns her sickness it is a closed chapter which at present she doesn't care to discuss. This remains for her as a "dream," as a "hibernation"; she is as if she were "a child who comes out from hibernation and looks anew at the world." Claire D. is cured socially. It might perhaps be considered a complete remission if sometimes her attitude and facial expression would not betray an internal tension which marks the patient particularly in her affective rapport as being somewhat stiff, uncertain and inadequate. What was the role of the treatment in this case?

Let us consider what the treatment is: during weeks for several consecutive hours the patient is in a state verging on death. There is amnesia of this phase in the conscious field but the sub-conscious probably does not undergo this test harmlessly. The patient comes out from this state astonished at being alive and he attaches himself very intensely to the new life. This is reflected in the intensity with which the primitive instincts come to the fore: to eat and to drink; one patient said: "Only after eating and drinking do I feel that I live again; before, my body is cold as ice, as if I were paralyzed, dead." Then comes the need to be entertained, to feel oneself protected. In many patients the first gesture after the awakening from coma is to extend the arms as for embrace. One of our patients at her awakening repeatedly during several days said: "Sister (nurse), shall I embrace you? I am so afraid I shall no longer awaken."

In such a patient the unconscious experience of such a treatment perhaps stimulates the instinct of preservation and of aggressiveness and makes her feel obligated to take a stand against the sickness. The patient wants to live again. This explains the feeling of

happiness which is reflected in the hypomanic state which is so characteristic of most of the good remissions following the insulin therapy.

On the other hand, the insulin treatment like the sleep treatment diminishes the resistance of the patient, rendering him completely dependent, at the mercy of his environment. He is actually like a new-born child whom one needs to take care of, to feed and to bring up. The patient cannot do otherwise than be influenced by others and this probably is also one of the essential points of the treatment.

3. The third example which I am going to present, differs entirely from the previous ones. We are dealing with a woman 44 years old, Mary H., who came to us on February 15, 1937. The personal and familial antecedents do not offer anything particular. Diagnosis: catatonic stupor. Prognosis for the attack: good. Since December 1936 the patient doesn't sleep. She cries, doesn't take care of her household, feels that she is being persecuted by people from the village. Her condition becomes worse to the point that before coming to us she attempts suicide with gas. In our hospital the patient is in anxiety, shows an expression of being desperate, feels that she is being influenced, that one steals her thoughts, everything becomes strange to her. She states that she hears voices during the night. Affective rapport with her is impossible. The insulin treatment begins on March 22. On April 6 there is an epileptiform attack. On April 7 one feels that there is a change in attitude of patient after she came out of coma; during the following hour one observes 3 reactions of anxiety: (1) the patient is afraid of her bed: "With these two black walls it looks like a coffin. Death always comes too soon." (2) Later on: the patient sees a red pullover and associates with it the word "blood." Then spontaneously she begins to tell her recollections of childhood: little girl, 6 years old, a butcher shop, the animals killed, she amuses herself in blood: "I was under a spell to ride on a still-warm corpse . . . . blood flowed . . . . it always comes to my mind again and again . . . . Since that time I cannot see blood and yet I like the color red." (3) A few minutes later a new panic: "The window looks like a crucifix. It reminds me again of blood and death." She dreamed of death, of a coffin, she was told in the village that she would be crucified, she saw also a power . . . . it will be the most terrible death . . . . then she said to the physician: "After-

wards you came, thank God!" On the 9th of April, two days later, during which the patient looks gay, approachable, slightly hypomanic, she talks of a dream in which the keynote is again cold, which is to be found in this and in other patients; in this dream one deals with an ice machine which puts into action a series of small packages of ice. The patient herself is one of these small packages; two persons are near the machine; the machine stops and the patient has the impression that one of these two persons takes her out from this ice. The patient adds: "I am so glad that the train of thought goes on again. But thanks to the treatment there is another turn, the transformation came quite suddenly." Then the patient herself explains her delirium and hallucinations. The recollections of the sickness remain, however, vague; the whole illness appears to her as through a veil and seems somewhat strange to her. The patient had to be operated on for appendicitis on the 12th of April. The treatment was therefore interrupted and it will not be started again because the patient's condition continued to improve. Here is an excellent remission accomplished in four days; there is no trace of the psychosis except that, like in the case of Claire D., there is a slight tension in the affective attitude and facial expression.

What can we conclude from what precedes?

With the insulin treatment the schizophrenic process seems to be arrested or deviated in its course. The insulin therapy, because it lowers the resistance of the patient and provokes an amnesia in the field of consciousness, thereby permits the mobilization and the dislocation of conflicts in the unconscious field. It is as if the treatment melted the ice in which the patient was isolated, and the art of the physician consists in helping the patient the moment the released conflicts come to the surface. It is a different task for each patient, for each patient has his individual reaction to the insulin therapy. The remission in certain patients takes place through controlling the unconscious conflicts, that is, by reaching a new mental and affective equilibrium without the physician's participation. The role of the physician is only to support and encourage the patient as it was in the case of Claire D. Other patients, on the contrary, as the patient Mary H., feel the need of expressing themselves; if in such cases the physician doesn't know how to listen to the patient, to direct him, and enter into rapport with him, the treatment may remain ineffective. This contact with the patient when he awakens

from coma and also during the whole course of the treatment, is in our observations the essential factor in the insulin treatment. Perhaps the success of the treatment essentially depends on the behavior and the psychotherapy of the physician who applies the treatment. That insulin itself exercises a specific influence and, in disturbing the hormone equilibrium, is conducive to a fundamental transformation of the affect of the schizophrenic patients, remains as yet unknown. All we can assert is that in each social or good remission we were able to find out the character and the schizophrenic constitution, the etiology of which remains unknown. This of course does not diminish the value of the treatment, but is the latter more specific than the sleep treatment, the pyreto therapy or the cardiazol treatment? The insulin therapy is an instrument of work, a means which perhaps better than other means leads the patient to come back in contact with the external world, and the physician to take particular care of the patient.

37. EXPERIENCES WITH THE INSULIN TREATMENT IN ENGLAND

H. PULLAR-STRECKER, EDINBURGH

I shall report to you quite briefly about the insulin treatment and in closing add some recommendations. I had the privilege of drawing the attention of the authorities in charge of the insane to the insulin therapy and of introducing the treatment in Edinburgh in 1936. This I owe to a meeting with Professor Henderson who is no stranger to you. In that country, conservative and reserved toward anyone coming from the Continent, it was not easy to awaken interest in the insulin treatment. Since then the situation has improved. This has been largely due to the activity of Dr. Isabel Wilson who, in connection with the pioneer work of the authorities in charge of the insane in Edinburgh, was commissioned to go to Vienna and Münsingen and to report on her observations there.

From March 1936 up to the present some 40 or 50 cases have been treated altogether in 4 or 5 institutions. Some preliminary work has appeared which, indeed, has more to do with the method itself than with its results. It is generally admitted that the results are encouraging, and this means much in a country where "not bad"

is higher praise than "good." There is as yet no comprehensive review of the few cases treated in England and I have no intention of giving one here. I limit myself to stating that the insulin treatment is just getting a foot-hold in England.

Finally, I shall offer some recommendations:

(1) To avoid confusion it would be well in the future to speak of 3 rather than 4 phases in the insulin therapy. The present third phase consists merely of the rest day on Sunday.

(2) In certain cases where no shock is indicated it might be worth while to try the effects of a mild hypoglycemia extending through the greater part of the day by using the new slowly acting insulin.

(3) I should like to suggest the collecting of data on the effect of smoking on hypoglycemia—Wilder has already referred to smoking in his book, and it is an experience familiar to us all, that smoking may considerably deepen the effects of insulin. Indeed, in cases where coma will not set in, one may force its onset by having the patient smoke. On the other hand, one must be prudent about smoking and not permit it until an hour after the awakening at the earliest, since it may cause an aftershock if allowed immediately.

(4) Finally, I should like to propose, where all is still in a state of flux, that all relapses, even when a second remission has followed, be entered in the statistics as negative results. For the statistics to appear worse on this account is, in my opinion, rather an advantage than the reverse. We cannot be too strict in our statistics, and we should take care knowingly to say too little rather than too much. In this respect, the remarks of the colleague from Wilno were quite refreshing. We can afford to round off our results downward. For with the insulin treatment there is no question of running a race—neither a race with spontaneous remissions nor with other methods of treatment—but of a respectable journey which will take us where we wish to go. I believe that at this meeting we have all received the impression that this is the case, and it can be of no concern to us whether at the same time records are broken or not.

IV. PAPERS READ BY TITLE

38. SOME OBSERVATIONS ON SAKEL'S INSULIN-HYPOGLYCEMIA TREATMENT OF SCHIZOPHRENIA

D. EWEN CAMERON AND R. G. HOSKINS[1]

We have been investigating Sakel's insulin treatment of schizophrenia at the Worcester State Hospital since March, 1936. In all, we have utilized the method in 20 cases. Our first objectives were to familiarize ourselves with the technique and to reach a decision as to whether the method will actually produce ameliorative changes. We felt that since skill in the utilization of the treatment was claimed to be of great importance it would not be feasible to attempt to evaluate it until we had had a considerable amount of experience.

Technique. For the most part we have followed closely the technique as outlined by Sakel and Dussik. It was our desire to select patients whose psychosis was of recent onset, but the number of recent cases, i. e., of less than six months' duration, constitutes a rather small percentage of the total admissions to American state hospitals. A considerable proportion of our patients have been of the chronic type, and patients in whom the illness has been slow and insidious with onset several years before the patient's condition necessitated hospitalization. Care has been taken to eliminate all cases in which there was a suspicion of heart or lung disease.

Treatment is given at first twice a day and then later, when coma levels are reached, the dosage is reduced to once a day with occasional rest days following on seizures or for other reasons. Experience has led us to differ with Sakel on one point. We have not felt that termination of the hypoglycemia by glucose introduced through a nasal tube has any great advantage over that brought about by intravenous injection. If too little sugar is given intravenously the patient sometimes rouses in states of anxiety, but if care is taken to

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give up to 150 cc. 25 per cent glucose the patient usually rouses without anxiety. We now utilize the nasal method rather infrequently because, in our experience, patients sometimes arouse very slowly and sometimes fail to arouse at all, so that it becomes necessary to give an intravenous treatment while the patient is in a half-awake and resistive state. We regard promptitude of termination of the hypoglycemia as generally advantageous. We have also found on several occasions that the nasal feeding produced a spasm of the glottis and that, moreover, the appetite for the next meal was spoiled. A second minor point on which we have differed with Sakel is that in chronic cases improvement may slowly continue over a fairly long period of time—8 months at least. We are in full agreement with Sakel that each case has to be treated individually and that the particular routine which is effective for a patient one week may have to be modified on the following week to give optimal results.

In our experience the most effective period for the termination of treatment varies in different cases. In paranoid patients the best results have usually been obtained when deep coma has been allowed to develop. In excited cases termination after a few minutes of light coma has seemed to be most effective. In the stuporous type of patient, stopping the hypoglycemia after the first period of drowsiness that usually occurs within 1½ to 2½ hours has seemed to give the best results. In the case of patients to whom large doses of insulin have been given and who begin to show evidences of incipient convulsions, the sugar is given at the end of about an hour. This interval has also proved desirable on occasion in patients who tend to pass into acute excitements later in the course of the hypoglycemia.

Dangers. On the whole, we have found that careful supervision of the treatment renders it less dangerous than its nature would lead one to expect. The chief danger lies in a failure to note a return of the hypoglycemia after it has once been terminated. This we have found especially apt to occur after loss of administered sugar by vomiting, but also when the patient feels nauseated or even disinclined to eat. Under such circumstances it appears that food, although ingested, is not assimilated, hence its contained carbohydrate is not available.

We have also noted that certain individual patients, who cannot as yet be put into any specific category, have a definite tendency toward relapse into hypoglycemia. For this reason our patients are kept under very strict observation for as long as 7 hours after the termination of treatment. Any increase in the pulse rate, sweating, or odd behavior is at once reported to the physician.

A second source of danger consists in the occurrence of repeated seizures. We have, however, always taken the occurrence of a seizure as an indication for immediate termination of the hypoglycemia and have noted no serious consequences. On the other hand, we are not able to report that the patient's condition is improved following on a seizure. In our experience the patient for the next 48 hours is more tense and antagonistic. There is no apparent similarity between his condition and the feeling of well-being which one sometimes notes following on a seizure and consequent release of tension in epileptic patients.

From our earlier experiences we feel that there are certain errors which a physician commencing work in this field is especially likely to make and which frequently adversely affect the outcome. These errors are failure to push the patient far enough into hypoglycemia in cases where deep coma is indicated. The occurrence of even quite severe clonic twitching is not in itself an indication for termination but when it appears *at the end of the first hour* it is very likely to lead to a convulsion, hence should be aborted with sugar. Slow pulse rate, unless it drops much below 50, and stertorous breathing, unless there is a definite spasm of the glottis or unless Cheyne-Stokes breathing appears, are not indications for the termination of treatment.

A second error consists in the failure to appreciate the necessity for individualizing the treatment and to utilize small changes in behavior as a guide in formulating the plan of therapy. It is to be emphasized that the treatment is likely to prove a prolonged and difficult procedure and should be facilitated in every way possible. The physician must be on the alert to observe and exploit small increases in affective response, in capacity to concentrate, and in interest in the surroundings.

A third mistake to which one may be tempted is to try to carry out intrusive psychotherapy on his patients. If the physician believes that the schizophrenic behavior arises from a conflict or con-

flicts between desires and fears, it would seem to be an appropriate task to discover the factors in the conflict and to attempt to provide a solution. However, in our experience, any aggressive probing in a search for conflicts definitely impedes improvement from the insulin treatment. We have found that our psychotherapeutic endeavors are more successful if they are addressed to keeping the patient as tranquil as possible throughout the entire course of treatment. Such endeavors seem to favor the beneficial influence of the insulin.

Cases. We have treated 20 cases in all. Of these 20, in only 5 had the illness been of less than 1 year's duration. Among the 20 there were 4 excited catatonics, 4 hebephrenics, 3 stuporous catatonics, and 9 of the paranoid type. In 1 of the paranoids alcohol probably had played a complicating role. All the patients save 3 were males.

Results. During the first 8 months we worked with 7 cases only. In none of these patients was the illness of less than 2 years' duration. In two of these cases treatment was stopped because of physical contraindications. Of the remaining 5, 3 have been able to go home on visit with some prospect of permanent discharge. Whether the outcome in these cases represents an improvement of the actual psychosis or merely a lessening of its more troublesome manifestations is as yet indeterminate. Of the remaining 11 cases, none have been on treatment for more than 4 months, and some for considerably less time. Three of this group have been able to go home on visit and several others are at least showing less obtrusiveness of their symptomatology.

In our experience, however, relapses are of frequent occurrence; consequently the number of patients who are ultimately able to go home is disappointingly smaller than the number who have shown initial improvement. While in some cases we can trace these relapses to undesirable psychological situations which have arisen on the ward, in the majority of instances no reason for them has as yet been found.

The first favorable change is usually in the affective sphere. The patient becomes more friendly and more interested in his surroundings. His behavior at the same time begins to become more normal. Excited patients become rather quieter, stuporous patients become rather more active. Shortly after this there is an improvement in the concentration so that the patient is able to undertake and com-

plete tasks which he would not previously attempt. Hallucinations and delusions begin to mean less and in favorable cases seem to disappear completely. In other cases they disappear, as judged from the day-to-day behavior of the patients, but can be elicited on close questioning.

Our present impression in regard to the value of the hypoglycemia treatment is that it offers considerable promise. Whether, under our conditions and with further mastery of technique, and, particularly, with more careful selection of patients, it will actually yield the high remission rates that have been reported from Vienna, Münsingen and Zagreb is a matter which only further experience will determine.

39. THREE AND A HALF YEARS OF THE HOPOGLYCEMIC THERAPY OF SCHIZOPHRENIA

Results and Problems

KARL THEO. DUSSIK [1]

When we review the $3\frac{1}{2}$ years which have passed since October 1933, since the first patient was subjected to the hypoglycemic therapy in Professor Pötzl's Vienna Clinic, we must recall many difficulties, worries, and disappointments. But these are far outweighed by the beautiful, often striking successes, sometimes scarcely credible to us ourselves. Thanks to Professor Pötzl's leadership and encouragement, Sakel's energy succeeded not only in reaching the goal of initial success, but also in arriving at a practicable method of systematic work, and in confining the danger to a very low degree. In fact, for a long time we were alone in this struggle, yes, even doubted and maligned. The fact that this time has passed is due to a series of valuable works by so many authors that it is no longer possible to count them all.

But the place of this congress is not the only thing which recalls to my mind some particular name that will forever remain inseparably connected with this new era in the treatment of schizophrenia. There is that of the chief speaker at this meeting, M. Müller. We

[1] Vienna Psychiatric-Neurological University Clinic. Director: Professor Otto Pötzl.

are grateful to him for the example he has set, for the work he has inspired, for his gift of organization, and for his friendship. Although he himself has written such significant works, in my opinion, he must be given great credit also for the fact that he made his own personality subservient to the desire to serve the cause, successfully advocating the standpoint of first testing exactly the method of Sakel in its true nature. I shall always be indebted to him also because he gave me the opportunity of carrying out with him the method and experiences of the Vienna Clinic in two months' collaboration in this beautiful institution. The great number of statistical reports at this meeting induces me not to give you a detailed report of our results. I should only like to mention that we have now reviewed altogether 350 cases in Vienna. Palisa and I shall soon publish detailed reports of part of these cases. From this work I should like to draw the conclusion that the results, as compared with the first statistical work of Sakel and me, have remained equally good.

The first group of patients, embracing all cases with an illness extending up to 6 months resulted in 70% full remissions, 15% good improvement, 8% evident improvement, and 7% completely negative. In the last few months a recent case that gave negative results was an extraordinary oddity.

From the beginning we have insisted that the effectiveness is so incomparably greater for recent cases, that we can even think of treatment for old cases of more than two years' duration only when all the fine points of the treatment are absolutely familiar and when the cost of treatment is not burdensome to the family or the community. But we must say in this respect that there are always cases that surprise one. And finally, it is obvious that the individual reactions of even very old cases are often so baffling that we, I believe, may hope that as yet we simply do not understand the mechanism of the fixation well enough to be able to secure good results in some of the old cases too. At any rate the demand must be made that schizophrenia be treated with insulin as soon as possible after the diagnosis has been reached. Indeed, from the general psychiatric observations stated in Professor Carl Schneider's address, I might almost formulate the rule that the treatment should begin on the first day of commitment, if possible on the first day of the psychosis.

As the danger of the therapy can be completely controlled by means of exact and skilled technique, I should like to think that in the future we shall use the treatment even in those acute psychoses where the diagnosis is not yet certain. Up to the present we have refrained from this as much as possible, for statistical reasons. In the first place, the diagnosis can have its validity tested during the preliminary phase of the treatment. Secondly, I have no doubt that by means of the treatment we shall aid the patient, at the time when the psychosis is still amentia, to shorten to a few weeks what would of itself have gone on for some months. This is, at any rate, to be preferred, I think, to the danger of passing, through diagnostic indecision, the moment when one could achieve a full remission from the schizophrenia. From the statistical works and from a consideration of the results that would otherwise follow, for example, sterilization, it is evident that this question must be taken into account.

I should like to present the argument which seems to me to favor this broadening of the indications for the use of the insulin therapy. Casuistic impressions lead me to the assumption that the duration of the illness before the beginning of the treatment is inversely proportional to the percentage of full remissions, to the quality of the remissions and also to the chance of permanency of the remissions.

When we consider the question of the permanency of the remissions, we are always conscious that our time of observation has been too short for us to give an answer.

If we review our results at that Station which has carried out the treatment longest, we have a good starting point.

An investigation carried out at the time by Palisa and me designated 60% of the first group treated as full remissions, 12½% as good remissions, 4½% as showing considerable improvement, and 17% as negative. But these figures represent quite different time intervals after the treatment, and therefore give only a general view.

A comparison of the further course of the first 10 paranoid cases shows us somewhat more, now that they have been under observation for a total period of 3-3½ years. In the beginning the report on these 10 patients showed 7 full remissions, 2 good, and 1 negative. Today 5 of the full remissions still hold and of the 2 good remissions 1 experienced a relapse which was again easily suppressed after 4 weeks of an ambulatory repetition of the treatment

for which the patient had voluntarily expressed a desire, so that he could again be discharged with a full remission. One patient finally ended by suicide, evidently in a relapse. Therefore, of the 10 paranoid cases who were treated first and who could be followed and observed after an interval of three years, there are today 8 who are able to pursue their calling, free from all evidences of the disease. Therefore these figures speak well for the permanency of the cures achieved.

We are aware of how many difficulties lie before us. We must manage to improve our results, especially with the old cases; we must test what factors condition the permanency of the remissions secured. All this requires many more years of observation. We are also conscious of still other difficulties. They do not concern the danger of the treatment. This has proved to be far less than was at first assumed since it has been shown that the undeniable factors of danger can be controlled.

It is perhaps practically useful to give a brief account of the chief factors or drugs which have so far been used by us to avoid the dangers whenever they were not of general benefit.

When the dose of insulin is repeated, we avoid increasing it by more than 10-15 units. We avoid injecting a dose of insulin after 6 P. M. After a rather long break in the treatment, we reduce the dose. In our estimation the danger of the shock depends more on the time of the hypoglycemia than on the size of the dose. 5-6 hours from the insulin injection to the sugar administration is the empirically established border-line beyond which one should go only with the extremest caution and the most urgent indication. A deep tranquil coma ("without defense signs") is not to be permitted to last longer than 1½ hours.

We have taken the delayed epileptic seizure as an absolute indication for the immediate administration of sugar. We give glucose up to 100 c.c. of a 33% [1] solution intravenously. This must be followed at once by sugar through the stomach tube. In all other cases we prefer interruption by tube. We give adrenalin only in case of collapse. We agree with Küppers that noticeable rises in temperature warn one to use caution and are best followed by a day without insulin.

[1] But not, as a lamentable typographical error in my Frankfurt report has it, 400 c.c. of a hypertonic solution of sugar.

Of late we seldom saw delayed awakening and the so-called delayed shock after the sugar administration by tube. We make it a practical rule to intervene and give intravenous glucose at once if a patient does not awake or show any definite signs of awaking within half an hour after the administration of the sugar. If 100 c.c. does not produce arousal, then we use betaxin, 1 ampule intravenously on the basis of Freudenberg's plan. Then comes the time for a puncture, and eventually for the resumption of feeding with glucose in solution. If there is a prolonged state of convulsions after the interruption of the hypoglycemia, then *status epilepticus* therapy must be employed: amylene hydrate enema, sodium luminal, pernocton and finally venesection. Also, there are rare conditions of choreiform hyperkinesis that follow feeding, in which the patient does not completely awaken. In these cases we consider the use of 1-2 ampules of novalgin intramuscularly as indicated in addition to the usual remedies. For cardiac edema of the lungs we recommend very slow intravenous injection of 20 c.c. of glucose with 0.00025 g. of strophanthin intravenously. In general one should not leave this remedy until too late. Japanese investigators saw 2 cases in very serious condition saved by blood transfusion.

Different accounts of the mechanism of the hypoglycemic shock, as they have been reported in this congress by Beiglböck and me, among others, induce us to try chromosmon as well as betaxin in cases of unsatisfactory awakening. We always use oxygen liberally. We consider the use of carbon dioxide very dangerous as a stimulus for arousal. We also consider as questionable the attempts to wake the patient by means of large doses of coramin given intravenously. On the contrary, it is probably advisable to use dioxyacetone.

By the use of all these drugs and the proper dose of insulin, long-delayed awakening after insulin will be found only in very exceptional cases.

The difficulties of the therapy, therefore, are hardly at all connected with its danger any longer. The main problem lies in the fact that we can certainly say it is possible to secure remissions by the use of hypoglycemia.

But it is undeniable too that not only the use of hypoglycemia is essential, but also the manner of its use is important. The form of the shock depth must be varied under certain circumstances ac-

cording to various not very well understood points of view. Neither the units of insulin used, nor the number of hours of the hypoglycemia, nor the number of shocks can give us more than superficial hints; the treatment remains even today based on the personal intuition of the physician, on his experience, his medical insight, and his ability to make decisions. The treatment is therein comparable to an operative procedure.

In the course of time we have learned to recognize certain rules which may serve us as a guide for the method of procedure. First Sakel was able to point out that the condition at the time of the interruption of the hypoglycemia is important because in many cases—certainly not in all—there is a continuation of the picture of the condition dominant at that time in certain characteristic features produced by the hypoglycemia. Sakel calls this retention "Fixation" as we know. If then we administer sugar during the activated-psychotic manifestations, after the hypoglycemia is over, the activated symptoms are apt to dominate the picture again, in whole or in part. On the basis of this observation there developed the new treatment of the stupor, based, as we know, on the fact that the sugar is best administered in the first half of the main phase, as we call it, in preference to the shock phase, since this is the time of the optimal reaction within the hypoglycemia, the reaction most closely associated with psychic health. In a stuporous condition most closely associated with psychic health. In a stuporous condition in which restraint is dominant the optimal situation will be the release which first becomes evident in a slight restlessness and relaxation and later in a more extensive freedom from restraint. On the other hand, with states of excitement in recent cases we shall choose the time of relaxation and calm before the coma for the administration of the sugar. Moreover, the "opposite effect" in manic and depressive states described at this meeting by Sakel is to be utilized. If after the removal of the restraint or the excitement, psychotic symptoms persist as, for example, of paranoid nature, we now use the deep hypoglycemic shock with coma lasting 1-1½ hours, with suspension of the corneal reflexes, appearance of the pyramidal signs, etc., or the disappearance of the autonomic reaction to the point of facial pallor.

It has now been shown that this "opposite effect" develops gradually in the sequence of shocks if one consistently interrupts

the hypoglycemia in a definite situation. On the other hand, we were able to observe that the excitement phenomena which appeared at first became less and less in extent, were suppressed more and more and finally disappeared with the employment of deeper shocks with coma. In the paranoid cases we could frequently notice that the shock changed its type in such a way that the originally tranquil shock induced more and more excitement phenomena. At the same time there is frequently a victory over the psychosis and with the increasingly more violent manifestations of excitation there is a development of activated-psychotic phenomena, that is, a release to a different level. If we now induce deeper shocks, which may happen because of increased sensitivity even though the dose of insulin is unchanged, there is again a gradual victory over these excitation phenomena so that often at the end of the shock phase in paranoid cases there is a decrease in the activated phenomena, and these cases remain tranquil both in and out of the hypoglycemia.

The observation of these excitation phenomena is closely related to the idea that with their appearance a defensive battle of the organism against the hypoglycemia plays a rôle. The accessibility is increased by the repeated overcharging of this system. Recently at the Vienna clinic we have been able to see that it is possible to favor the course of these excitation phenomena systematically. On the one hand it is possible through sudden changes in the dose constantly to create new conditions and on the other by the use of adrenalin to smooth the pathway for the excitation phenomena. If we give adrenalin at the end of the shock, then extraordinarily contradictory effects may be observed. There are cases that are to be awakened with adrenalin. But in other cases there may be—more rarely, and especially when the shock is very deep, perhaps also if the dose of insulin is rather large—a deepening of the hypoglycemic shock after adrenalin is given. This is true at least for the largest dose permissible, in our opinion, 1 mg. subcutaneously. In the next shocks were repeated increases in the motor phenomena, so that we could recommend this idea for the treatment of catatonic stupor if the use of adrenalin did not entail a certain danger. The increase of the stroke volume through the hypoglycemia puts, *per se,* an additional burden on the heart. If we add to that the effect of adrenalin then the results may be dangerous. On the other hand, drugs that have an effect similar to that of adrenalin, sympathol in

particular, appear to give an effect merely typical of that of adrenalin. Here perhaps lies a question which may make possible for us an approach to the control of the different types of the hypoglycemic reaction. By giving daily for a short period doses of ¾ mg. of adrenalin subcutaneously at the same time as the feeding we were able, in two old cases of a stuporous-vacant character, to obtain in the way described results which in my opinion we could not have secured by insulin alone. On the other hand it is possible to counteract excitation with gynergen and, according to Sakel, also with azethylcholin. But these studies showed a certain increase in the danger so that the experimental stage has not yet been passed and there is as yet no justification for their use on a larger scale. They were mentioned here because they correspond on the clinical side to Sakel's original plan as he laid it down in his theory of the disease and as he took it up again in the working hypothesis of his book. The ideas that we have represented in the common work of pathophysiology and psychiatry in the Vienna clinic and which I have recently had an opportunity to work on in New York show also how fruitful this therapy and its concept can be and how great a lack of clarity there still is on many points. But they also leave open the hope of sometime arriving by this path at what Sakel has called pathophysiological psychiatry.

40. EXPERIENCES WITH THE INSULIN SHOCK THERAPY IN SCHIZOPHRENIA

A. KRONFELD AND E. STERNBERG,[1] Moscow

For about a year we have been carrying out the insulin shock therapy on a large scale at the Gannuschkin [Moscow] Institute for Psychiatric Research. The number of cases already treated by us amounts to more than 200. The method has aroused great interest in the Soviet Union and is now being used in several clinics both in Moscow and in other cities.

In two earlier articles in Russian we described our current results and experiences with respect to the therapy. A comprehensive account of the procedure and of our experiences with the technique, a detailed digest of the numerous problems and of the phases re-

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quiring further study as well as of the practical results is being prepared by us and our co-workers and will soon be published. We believe we should avoid here a repetition of matters already fully discussed or a systematic presentation of the technique. Likewise we do not wish to treat in detail single observations or special laboratory data. It is also not our purpose to discuss in advance the mode of action of the therapy or construct pathophysiological explanations. We merely wish, from a purely clinical point of view, to raise questions which in the course of our experience we had to recognize as especially significant.

The deciding question from the clinical standpoint is without doubt the question of therapeutic value, to be answered by the number and extent of recoveries. In this connection a consideration of various publications, a comparison of the results of different clinics shows that the clinical evaluation of the therapeutic effectiveness has certain difficulties and uncertainties which may be the source of a verdict that is too positive or too negative. Such statistical results as are found in many publications and such as we have given in the articles mentioned are a questionable means of proof. The material on which they are based is differently compiled in the various papers in conformity with the character of the institutions and the diagnostic habits of the investigators, and on these factors depend to a great extent the number of successful results. To illustrate by a single factor only, a predominance of cases with recent acute onset, or of cases with certain definite clinical features exerts great influence on the quality of the results. Indeed, treating only men is probably enough to secure better results, for according to our statistics women seem less often to respond favorably to the therapy than men. On one occasion when we admitted to treatment a large series of patients in the terminal stages, our current statistical results became much worse. Moreover each case must be evaluated individually and with great foresight. Although we did not admit to treatment patients in whom a spontaneous remission was evidently beginning it is always possible that a deep-seated tendency to spontaneous improvement in an individual case may escape observation. With cases that show remissions and phasic variations a purely statistical statement of success or failure for each case is inadequate. In a given case the duration of the untreated and treated recurrences, the course of the improvement and

the duration of the untreated and treated recurrences, the course of the improvement and the duration of the remissions should be considered before anything may be said with regard to the value of the treatment for that particular case.

Similar uncertainties attend the criteria for improvement and for practical clinical cure. Freedom from symptoms and even presence of insight are surely frequent results. Nevertheless even in such favorable cases careful analysis shows lasting alterations in personality. There may be only weakness in drive, in activity and initiative, a certain subjectively felt slackening in the realm of affect and volition, a heightened sensitivity to the difficulties of life, etc. In the concept of improvement medical and social criteria overlap. No one of these criteria alone is adequate for an exact definition of the results. We see patients who are symptom-free and cured in the medical sense too but so changed withal in their personality and in their adjustment to the world about them that they are social misfits and the term "full remission" can have little meaning if applied to them. And we see on the other hand patients with intangible propitious changes in their attitude toward their symptoms so that they become again social beings although they are not cured in the remotest sense of the word. If we take the concept of remission as equivalent to fitness for discharge, the conditions for which vary from case to case and depend also on social factors, we obtain very high remission rates. These statistics speak definitely for the practical value of the therapy. It seems to us especially wrong to expect complete biological cures and pile up statistical pyramids with the concept of full remission at the apex when we are dealing with a disease of unknown etiology and pathogenesis and when its nosological identity is not altogether beyond question. Accordingly we speak of successful treatment designedly whenever the patients are so improved that they can be discharged or return to work even with persisting symptoms or lasting changes. Indeed, in obstinate cases running an unfavorable course, when menacing symptoms which render treatment in the clinic difficult such as hyperkinesis, refusal to eat, stupor, etc., are overcome, we regard the success of the method as more impressive than when remission is actually attained after 2 to 3 months' treatment in cases which from the first tended in that direction. Of course, we should not describe results of this sort as full remissions, a term used

somewhat generously, it seems to us, in other publications. If full remission is limited, as we limit it, to complete freedom from symptoms, presence of active social life and only slight alterations in the personality, then the statistical figures will of course be much lower.

Within the limits of this paper we wish to give only a general review of our results as we have calculated them in keeping with these standards and those sources of error that we have mentioned. As good results or great improvement we designate that group of patients all of whom are well enough to be discharged but include a continuous series ranging from the ideal medical full remissions to social remissions with residual symptoms or symptom-free cases with evident personality changes. This group makes up about 50% of our treated cases. For men the percentage is slightly above 50%; for women it is somewhat lower, 35 to 40% of the treated cases. The cause of this differences lies in part in the fact that for obvious reasons we have among our female patients a great proportion of chronic and terminal stages, which we treated in order to study the effectiveness of the therapy. Still the difference between the sexes is greater than would be accounted for by this circumstance. An exact analysis of this group of successful results or remissions cannot be given in this paper to the extent desirable in view of the great importance of these observations for the outcome of schizophrenia. This matter will be dealt with in the publication already mentioned. In the group of slight improvements and alterations, which in the light of the foregoing remarks we also regard as good results of the treatment though not so important clinically, the statistical figures are even higher. In a few of the negative cases we had the impression that the treatment hastened the advance of the psychosis.

It is noteworthy that the number of successful treatments is well above the percentage of spontaneous remissions, variously as this figure is estimated by different authors. Our results are not as good as those obtained in the Vienna and Swiss clinics. The reasons for this difference are in part apparent from what has been said and the same reasons, apart from the somewhat different method employed, explain the still less favorable results of the Wilno clinic.

With respect to the various syndromes schizophrenia presents and the various types of clinical course it runs, our statistical material is divided into groups which give much more information than general statistical tables do. For instance, there are completely refractory cases in every group. With no group can we make a prognosis except on the basis of greater or less probability. The most unfavorable outlook is that of chronic cases which have lasted many years, the so-called terminal stages. If we neglect occasional instances of transitory improvement or change of condition, we can speak of 0% successes in this group. Poor too is the outlook for hebephrenia and for all bland forms that have a slow onset and a slow course with few symptoms. It is poor even though they are brought in for treatment in the early stages, and even though the disease appears to run a mild course. Apathetic, inert, hypochondriacal paranoid forms are relatively refractory. A prognostic point with this group is the degree to which the patient reacts affectively to himself and to his illness. The more lively this affective reaction is in a depressive hypochondriacal picture, the sooner we see good results.

In contrast to the patients whose illness runs a slowly progressive course stands the group with phasic forms and remissions especially when the phases begin abruptly. Cases that had passed through several such phases and therefore had to be looked upon as chronic, nevertheless reacted favorably as a rule to the treatment. In any given case of course no one can ever tell whether the remission would not have come about equally well without treatment. This is a difficulty inherent in this type of case. But when we wait months in vain for a remission and then it appears promptly in close connection with the insulin therapy, the conclusion is that the therapy has hastened the onset of the remission and in many cases has actually mobilized a tendency to remission which would otherwise have remained latent and perhaps entirely ineffectual.

All the authors have emphasized the extraordinarily large proportion of successes with the therapy in acute cases who are having their first illness. In the ones with acute onset, and especially in those whose treatment was started early, we can only confirm this. Patients who are ill for the first time and whose illness is of less than 6 months' duration often do not require at all the drastic prolonged treatment with shock-producing doses. Success often

follows a few weeks of treatment with only a few shocks or in many cases even without any. Now the tendency to spontaneous recovery after first attacks that have an acute onset is fairly great. Although the statistical results with the insulin therapy are better for this group, in any given case it is impossible to say more than that the insulin has stimulated or enhanced a tendency to remission which was not noticeable before the treatment but perhaps would have been realized even without it.

Therefore of decisive importance in the question whether there is a causal therapeutic relation are those cases which are already having a second attack and those in whom the acute initial phase has already passed over into a chronic picture. But on these points the data are not very clear. Among the second admissions, among those cases whose first attack was followed by a remission and the remission by a recurrence, the therapy has achieved a number of good remissions on the one hand and met with numerous failures on the other. One never knows what proportion of patients successfully treated had been running a phasic course. The prospect of their recovery falls off sharply as the duration of the illness increases, so that after two years have passed, a good result is rare. With catatonic patients diverse results are obtained: the acute phasic forms have a good prognosis, the chronic stereotyped forms a poor one.

From this brief sketch it is apparent that the clinical picture and the usual symptomatic classification of the disease are of much less moment for the results of the therapy than are the type of onset (sudden or gradual), the type of course, and the duration of the illness before the beginning of treatment. Other factors for determining the prognosis depend on whether or not the affective assets of the given case are easily mobilized; whether the patient is still productive of symptomatological content, keeps on fabricating systems and reacts to arguments opposing them, or becomes monotonous and poor in content; finally whether the production of symptoms predominates or there is a change indicative of a breakdown of the personality. The prepsychotic personality appears to play some rôle: sthenic temperaments which occupy themselves actively with the psychosis—even to the point of delusion—may heighten the therapeutic action and help to produce a more complete recovery. It has often been observed that patients who construct

psychotic content in abundance, especially hallucinatory or delusional content, respond to the therapy exceptionally well. With paranoid forms it must be admitted that, along with the most amazing instances of recovery, there are others in which the therapy passes absolutely without effect. These are usually rigid patients unproductive of delusions and others who have surrendered passively to their delusions and the psychotic experiences underlying them.

We should like to point out one symptom which in our clinical experience makes a very poor response to treatment. It is catatonic stupor. Of our 8 stuporous patients only one was cured. Here too our observations are in accord with those of others.

No trustworthy idea of the permanency of the improvement can be gained from our material. Our first remissions date back only 9 months. Among our relapses we should like to distinguish two groups. The first of these is relatively small and is made up of isolated cases. It comprises recurrences after remissions lasting several months. More frequent are the recurrences that follow what is undoubtedly a premature termination of the treatment. They can hardly be called relapses in the true sense of the word. The patient's condition was good when the treatment was discontinued but after a few days or weeks it began to grow worse. This turn for the worse can usually be reversed in a relatively short time by resuming the treatment. From these cases we should learn the practical lesson not to cut the third stage of the treatment too short even when the result is good.

The observation of the structure and course of the improvement, and of the direct effect of the hypoglycemia on the psychotic picture are of exceptional psychopathological and clinical interest. The appearance of a change, or improvement, in the psychotic condition during hypoglycemia or immediately after it is a frequent occurrence. One is always filled with fresh amazement on entering the rooms of patients who have just been treated. One sees in such patients a lively contact with one another and with the doctor unlike anything seen otherwise in schizophrenia. Since even the majority of those patients who in the end are not greatly improved also exhibit this change of mentality, the improvement of the clinical environment constitutes no small part of the advantages of the procedure. While we cannot report here details of the mechanism

of improvement, we wish to note the points which seem to us of significance. The improvement is ushered in, as is reflected in the experiences of the patients, by these related forces: a quieting influence in the spheres of impulse and affect, a tendency to euphoria, a change in fundamental mood due to the withdrawal of peculiar dysphoric sensations, feelings, and psychosomatic elementary phenomena joined with a dimming of psychotic content and an enfeebling of the patient. Two facts of importance for the therapy stand out: 1. The somatogenous and situational nucleus for the psychotic mode of reaction to content sinks into the background. In particular, the normal boundary between the ego and physical reality is restored. It is the menacing invasion of the world into the territory of the ego that is the source of so many symptoms of the schizophrenic process. While the normal sensations of the body and of the whole self gradually reappear during the period of asthenia, the world of reality loses its special schizophrenic interpretation. 2. As was assumed in Klaesi's and Kaplinsky's explanations, there arises from the inner transformation just described a need for contact which is well adapted to break up the autism.

Consequently the patient may feel gradually impelled to make a new arrangement with himself, his disease, and life. This is the opportunity for the doctor in charge of the case to begin energetic psychotherapy. It must be handled cautiously so as not to stir up the depths of the affect. We see the patient come to an understanding with his psychosis in various ways as the improvement commences. No doubt the earlier assumption that a psychosis must be overcome by an enhanced critical power and insight is too narrow. Certainly a critical attitude on the part of the patient often becomes noticeable very early in the treatment, most often when the hypoglycemia leads to deep alterations in consciousness associated with amnesia or to transitory extensive clearing of the psychotic picture. We saw this happen also in cases treated without success. A patient with advanced passivity and persecutory delusions, who went to pieces quickly in spite of treatment for 3 months, within half an hour after the hypoglycemia was terminated remarked, "How can I believe such nonsense, such delusions, and tell them to you?" A rigid catatonic who in the course of a lengthy treatment had grown no better asked several times after the shock, "Do you think that schizophrenia can be cured in a man with a family history

like mine?" It appears to us of great interest to psychopathology that the so-called insight and critical faculty can make a transitory appearance with no permanent improvement and is not an absolute manifestation of a real remission. Critical readjustment may be indicated when the psychotic experiences are not expressly corrected but are handled by the patient in some other way, like physical symptoms for instance. Not infrequently we hear expressions like "I had a lot of hallucinations yesterday." More often improvement comes about by way of a gradual fading of the symptoms which lose their special meaning and their affective connotations until at last—without correction, without insight—they are scarcely noticed any longer or are successfully encapsulated. Improvement can proceed a long way in the realm of delusion; machines operate less intensively; waves grow weaker; adversaries are reformed, etc. All these forms of adjustment to the psychosis must be applied in a manner suited to each individual. They lead the more quickly to remission the more the therapy alters the physical correlation of the psychotic experiences and the more the increasing activity so often observed, the spontaneity and initiative facilitate the establishment of connections with the world of reality.

Partial improvements are of special value to psychopathology since they furnish evidence concerning which elements in the clinical picture are primary symptoms of the schizophrenic process, which ones are created by the personality in reacting to this process, and which are manifestations of already existing defects. Thus our observations show us over and over what cannot be established in single cases, that autism is frequently a secondary product of many factors. We saw autism disappear while there persisted severe primary disturbances such as disturbances in mentation, ideas of reference, etc. Doubtless of a secondary reactive nature, and so relatively susceptible to the therapy, are the striking behavior patterns of schizophrenic patients,—catatonic motor peculiarities, contortions, grimaces, etc. At the other extreme these incomplete improvements often exhibit the incorrigible defects of schizophrenic personality changes which manifest themselves in lack of drive, of activity, and of initiative, loss of productivity, superficiality of mental attitudes, etc. The insulin therapy provides us with pictures of "defect cures" similar to those provided by the malaria treatment in general paresis and of equal importance for the understanding of symptom structure.

Considering the nature of the therapeutic factors, we incline to the view that a fundamental biological mechanism undoubtedly plays a rôle of a very definite and at the same time universal bearing. But this is non-specific pathogenetically: it is perhaps the same in other methods of active therapy. Serejski has given a detailed account of it in his report at the II Pansoviet Psychiatric Congress. All the laboratory data previously published, though of importance for understanding the physical effects of hypoglycemia, with regard to the specificity of this process can do no more than indicate an all-pervasive vital transformation in the fundamental spheres of the affect, and so in the subjective life.

From these considerations some beginning is already made toward understanding the indications for the therapy in general, a subject we do not wish to enter upon more fully here, and especially toward adapting the method and technique of the therapy in the individual case. As regards the technique of treatment, a more exact description seems unnecessary here since the technique practiced in our institute differs in no essential points from that carried out by Sakel, the Vienna clinic, and by M. Müller. Of course, as experience increases, the observation of numerous technical details is found to be of value in securing a successful result. Therefore we are planning to publish separately a detailed account of our technique. The central problem is always where and when shocks are necessary and when it is advisable to interrupt them. In this regard our progress from the stage of intuition based on personal experience to that of definite rules was a slow one. The most important task is unquestionably a thorough adaptation of the method to the individual patient. It is hard to give exact rules for this process. Certainly it is not true that a treatment attains its end more surely the more drastic it is, the more numerous and deeper the shocks are. We had several cases in which we employed 80 or more shocks of long duration but were unable to reinforce or even to maintain the improvement that had at first appeared. Now we know that this early improvement can often be turned to advantage by intensive psychotherapy while at the same time we diminish the dose of insulin or cut short the hypoglycemia before shock occurs. If then the improvement fails to continue or the patient grows worse, we step in again with several deep shocks. Interruption during the stage of excitement in stuporous patients, as Sakel advised, was successful in some cases but not in others. In acute cases in their first illness

we keep the shocks light. Here too it is advisable after a series of shocks to relax the therapy and observe the patient's course. In very excited patients we interrupt the hypoglycemia very early in the treatment when tranquillity comes on. Even the manner in which the shock is interrupted seems to make some difference. In many cases we had the impression that the patients felt better after the sudden awakening by intravenous glucose than after the slower interruption by tube.

As numerous authors have declared, the dangers of the method are greatly overestimated. In our institute no death has occurred in a series of over 200 cases. Still we have seen menacing complications in the form of severe circulatory collapse, severe epileptic attacks associated with collapse, status epilepticus, pulmonary edema and bronchopneumonia. Naturally, therefore, we give our patients the advantage of very thorough medical examination and care.

Quite apart from its clinical and therapeutic aspects, the procedure has raised a number of problems relating to the pathophysiology, the psychopathology, and the neuropathology of the hypoglycemic state. These problems are being worked out at length in our institute. The department of experimental therapeutics under Professor Serejski will report the results in detail later. For the present we confine ourselves to the statement that we agree with M. Müller in regarding the overwhelming majority of the pathophysiological phenomena occurring in the hypoglycemia as a direct toxic action of insulin. This applies to states of excitement, states of bewilderment with or without hallucinations, and the states of delirium. The activation of the psychoses observed by Sakel and the reaction reversal are rarities. We have devoted special attention to the cerebral symptoms of all kinds that occur in the hypoglycemia. Since it is impossible to make even a passing allusion to the abundant manifestations and altogether out of the question to explain them, we confine ourselves to this statement: We saw both elective and non-elective affections of nearly all the cerebral systems and mechanisms. It seems to us therefore at present hardly possible to assume any local origin for the basic disturbance or to formulate laws for the order and sequence of the phenomena. Nevertheless a number of localized and functional complexes stand out as, for instance, the greater susceptibility of the left hemisphere, the frequent release of primitive sub-cortical motor mechanisms,

etc. Very significant observations are possible with regard to the structure of schizophrenic motor phenomena.

The special clinical interest of the method lies not only in its significance for therapy but also in the extensive material it provides for the experimental study of brain pathology.

41. RESULTS OF THE HYPOGLYCEMIC SHOCK TREATMENT OF SCHIZOPHRENIA

K. KUBO [1]

The number of cases of schizophrenia treated by the method of the Vienna Psychiatric Clinic was 27. Of these 8 were recent cases (Group A), 12 of more than 6 months' duration (Group B), and 7 were old cases of more than a year's duration (Group C):

	A	B	C	27
Cured	4	4	0	8
Improved	1	4	1	6
Negative	1	4	6	11
Died	2	0	0	2

The cause of death was the inexperience of the physicians and the nursing staff. One of the deaths occurred in coma, and the other was due to pneumonia following the shock treatment.

Notes: Blood transfusion was twice able to save life. Insulin "Tomoda," Insulin "Tronto," Minigrin "Takeda."

42. HUMORAL CHANGES IN THE TREATMENT OF SCHIZOPHRENIA WITH PROLONGED NARCOSIS

Cloetta's Mixture (Cloettal)

A. E. KULKOW, W. J. WEILAND, B. E. KAKUSINA [2]

In the winter of 1936 at the psychiatric clinic of the I. Institute of Medicine in Moscow we carried out the treatment of different phases of the schizophrenic process by prolonged narcosis by means

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[2] From the Neurological Division (Director: Prof. A. E. Kulkow) of the Institute for Neuro-psychiatric prophylaxis (Director: Prof. W. A. Wnukow).

of Cloetta's mixture.[1] In connection with this, we undertook the problem of studying the humoral changes occurring in the course of this treatment.

This study presents a two-fold interest: first, from the point of view of the direct influence of the preparation itself on the body fluids and in particular on the blood; and second, the elucidation of the mechanism of its effect, especially in those cases of schizophrenia where a therapeutic effect was obtained, though not to the desired degree.

The question of the biological mechanism of prolonged narcosis, which was introduced into the therapy of psychoses for the first time by Klaesi in 1923, is still unanswered. In this connection the works of Schriewer and Schriewer-Herzberger are of great interest. They found a shift to the left in the morphological blood picture in prolonged narcosis. With the idea that prolonged narcosis has a non-specific stimulating effect on the organism, they assert that a change in plasma colloids in the direction of a coarse dispersion is observed with stimulation therapy, that is, an increase in the amount of fibrinogen and of the globulins and an accelerated sedimentation rate dependent on it.

Starting with the notion of the nature of the effects of narcotic substances on the organism, especially of substances of the barbituric group (to which Cloetta's mixture belongs), we carried out the following series of researches with the cases treated: (1) a general morphological study of the blood and the sedimentation reaction of the erythrocytes; (2) a determination of the total amount of protein, globulin and albumin by the refractometric method; (3) of the amino-acid and polypeptide nitrogen (Folin); (4) of the rest nitrogen (Kjeldahl); (5) of the blood bilirubin (Hymans van den Bergh); (6) of the calcium (Waard); (7) of the potassium (Kramer); (8) of the sugar (Hagedorn); (9) of the haloids: the bromides (Indovina), the iodides (Elmer) and the chlorides (Mohr, with the modification of Levinson). We made

[1] In the course of the winter of 1936, 20 cases were treated by prolonged narcosis, using Cloetta's mixture, in the psychiatric clinic of the I. Institute of Medicine, Moscow; there was not a single fatality. The results of the treatment cannot be called encouraging, at least on the basis of our slight experience.

our studies on 20 patients with different types of schizophrenia. The determinations were made before the narcosis, during the sleep, and after the awakening.

We put in the foreground the morphological changes of the blood, changes in the protein and the protein-metabolism in general, since they are the most definite signs of the humoral changes in the organism.

The Morphological Blood Changes and the Sedimentation Reaction of the Erythrocytes

The clinical study of the blood and the sedimentation reaction of the erythrocytes was carried out before the narcosis and then daily during the narcosis and for some days after the awakening of the patients. If we examine the results rather closely we can see that the hemaglobin content and the number of red cells show very slight variations, while the leukocytes and the sedimentation rate of erythrocytes show the most pronounced reactions. According to Schilling and other authors the shift of the neutrophils toward the left is symptomatic of most varied conditions, especially of infections and inflammatory processes. He distinguishes in the changes of the leukocyte equilibrium first a neutrophil phase of the fight of the organism, with an increase in the number of stab-forms, then a defense phase with an increase in the number of monocytes, and finally a lymphocytic convalescent phase in which there is not only an increase in the number of lymphocytes but also a return of the eosinophils, which had disappeared.

If we turn to the results of our researches, it is evident that very early—with most patients on the second day after the administration of the narcotic—the total number of the leukocytes was increased, due to an increase in the segmented neutrophils, and then after another one or two days the number of stab-forms also increased. This increase in neutrophils generally reached its peak on the fourth or fifth day and then declined, to rise again suddenly with new strength on the eighth or ninth day of the narcosis, when the largest number of stab-forms was to be found.

The lymphocytes behaved in a manner exactly opposite to that of the neutrophils. Their opposite tendency was all the more clearly evident because no great changes were to be seen on the part of the

Name and age	Total Protein in g %	Albumin in g %	Globulin in g %	A/G ratio	Amino nitrogen in mg %	Poly peptide nitrogen in mg %	Rest nitrogen in mg %	Bilirubin in mg %	Potassium mg %	Calcium mg %	Sugar in mg %
1. Ko.	10.28	7.5	2.78	2.69	11.6	2.6	32.5	0.5	20.87	11.2	90
26 years old	9.8	6.72	2.91	2.3	10.62	2.4	37.12	0.5	22.0	10.4	98
	8.07	6.29	1.78	3.5	9.6	1.2	39.78	0.6	18.75	14.4	102
	8.12	6.10	2.02	3.01	8.0	6.0	39.8	0.5	18.00	10.32	100
	8.5	5.65	2.85	1.99	11.8	0.2	36.0	0.55	23.14	12.4	104
2. Ku.	8.14	5.84	2.3	2.53	11.02	3.54	35.2	0.4	18.97	9.64	91
24 years old	6.35	3.05	2.9	1.05	11.32	4.88	36.8	0.4	23.69	10.0	84
	6.7	1.2	5.5	0.21	9.68	4.92	41.6	0.55	19.73	10.9	94
					10.8	3.64	36.2				148
3. Po.	9.04	6.67	2.37	2.81	9.4	2.6	27.5	0.4	17.75	8.14	104
23 years old	9.52	6.5	3.02	2.15	12.0	5.1	31.5	0.55	18.9	8.9	75
	7.09	4.82	2.27	2.12	—	—	38.9	0.5	20.22	13.6	64
					10.4	0.3		0.4			91
4. Po.	6.88	4.69	2.19	2.14	9.7	8.9	33.3	0.55	18.95	9.45	
31 years old	6.82	4.33	2.49	1.74	10.2	3.2	36.3	0.55	20.02	11.18	120
								0.575			
	7.0	4.6	2.5	1.84	10.0	1.6	34.8	0.55	20.5	10.12	161
5. Scha.	7.57	6.42	1.15	5.58	10.8	1.6	20.12	0.575	19.24	9.9	102
32 years old	8.73	6.03	2.7	2.23	11.66	5.56	33.0	0.6	20.12	8.72	107
	6.99	5.1	1.89	2.69	11.0	1.0	40.4	0.45	20.18	8.48	102
	8.7	6.03	2.67	2.25	10.2	2.8	34.8	0.3	18.6	2.15	100
6. Schk.	7.11	4.95	2.16	2.29			36.4	0.25	21.3	12.4	104
25 years old	6.64	4.32	2.32	1.86			37.8	0.2	20.5	8.92	78
	6.85	4.56	2.19	2.08			35.5	0.25	18.8	11.6	128
7. Gr.	7.52	5.21	2.31	2.25	11.74	2.26	40.12	0.45	24.76	9.8	111
29 years old	7.28	5.05	2.23	2.26	13.0	2.6	47.5	0.65	17.32	13.2	109
	7.0	4.4	2.2	2.18	12.4	2.64	47.9	0.55	20.5	8.4	125
	7.55	4.83	2.72	1.7	12.8	5.2	50.0	0.95	24.92	9.0	109
8. Jak.	9.32	6.21	3.11	1.99	10.6	0.86	34.6	0.3	19.56	10.6	94
32 years old	7.0	3.58	3.42	1.04	12.4	3.0	36.2	0.35	12.12	9.48	97
	7.5	5.02	2.48	0.68	11.66	1.2	34.8	0.3	16.32	6.6	129
9. Sch.	7.76	6.31	1.45	4.33			37.77	0.75	21.15	14.0	104
23 years old	7.22	5.1	2.12	2.4	10.1	5.3	39.8	0.325	18.55	12.0	104
	6.65	4.7	1.85	2.53	10.8	5.2	37.6	0.35	19.84	7.93	80
10. Tscher.	5.99	4.77	1.22	3.9	11.55	4.5	24.0	0.475	17.4	7.12	104
31 years old	5.78	4.48	1.3	3.44	12.4	0.9	35.4	0.325	26.05	8.5	112
	6.0	4.18	1.82	2.29	9.4	4.0	33.6	0.325	19.92	12.48	8
	6.02	4.3	1.72	2.5	10.2	2.94	34.8	0.275	17.82	12.6	9
11. Be.	8.4	5.48	2.92	1.87			35.4	0.525	19.5	8.4	100
38 years old	6.96	3.8	3.16	1.12			38.2	0.35	19.27	6.96	13
12. Ka.	8.12	5.72	2.48	2.38	10.0	5.5	33.8	0.325	16.78	7.85	10
25 years old	7.3	2.22	5.08	0.43	10.0	4.4	39.2	0.325	16.85	10.28	9
					10.2	3.4					13
					9.4	2.6					
13. Bl.	7.2	5.02	1.98	2.53			32.8	0.25	28.13	1.35	10
35 years old	6.82	3.08	2.74	1.12			34.6	0.25	24.78	12.2	8
	6.87	4.75	2.12	2.24			37.0	0.25	22.9	11.8	12
14. Il.	8.4	5.4	3.0	1.8	10.6	6.2	34.2	0.275	21.79	12.6	12
29 years old	7.14	4.99	2.15	2.32	10.52		34.8	0.3	21.82	10.8	8
	7.18	5.12	1.96	2.6	10.4	1.6					12
15. Sa.	8.79	5.89	2.9	2.6	8.72	3.38	44.8	0.6	17.89	8.6	13
31 years old	8.62	5.52	3.1	1.78	9.6	9.2	45.2	0.45	23.0	8.2	10
16. Dm.	9.6	6.1	3.5	1.74			34.5	0.5	21.12	13.07	11
38 years old	6.93	3.0	3.93	0.88			46.5	0.9	21.05	10.0	10
17. Ti.	8.21	6.1	2.11	2.89	10.7	1.56	33.6	0.55	20.54	9.32	12
40 years old	6.51	2.44	4.07	1.66	11.7	5.58	34.75	0.5	20.67	13.5	10
	6.54	2.24	4.3	1.91	10.6	2.4	34.75	0.5	20.87	9.6	10
18. Jak.	7.72	5.51	2.21	2.49	10.7	0.8	34.8	0.37	22.3	12.1	
38 years old	6.99	4.14	2.85	1.45	11.0	5.0	36.4	0.4	23.38	13.0	

Cal-cium mg %	Sugar in mg %	Bromide in mg %	Iodide in mg %	Chloride in mg %	Time of the study	Preliminary Results
11.2	90	0.220	0.0312	581.38	Before the narcosis	
10.4	98	0.480	0.0288	596.7	On the 3rd day of sleep	Relative
14.4	102	0.160	0.0250	528	On the 8th day of sleep	improvement
10.32	100	0.240	0.0150	608	After awakening on the 5th day	
12.4	104	0.210	0.1875	538	After wakening on the 11th day	
9.64	91	0.100	0.0234	608.4	Before the narcosis	
10.0	84	0.300	0.0292	550	On the 3rd day of sleep	No
10.9	94	0.200	0.0370	544	On the 8th day of sleep	improvement
	148	0.190	0.0150	479	After awakening on the 10th day	
8.14	104	0.220	0.0230	551.6	Before the narcosis	
8.9	75	0.210	0.0220	608.4	On the 2nd day of sleep	No
13.6	64			520.65	On the 8th day of sleep	improvement
	91	0.280	0.0280	526.5	On the 1st day after awakening	
9.45		0.360	0.0170	532	Before the narcosis	
11.18	120	0.300	0.0150	608.4	On the 4th day of sleep	
				497.25		Improved
10.12	161	0.280	0.0172	520.2	On the 2nd day after awakening	
9.9	102	0.420	0.0280	503.1	Before the narcosis	
8.72	107	0.230	0.0270	491.4	On the 1st day of sleep	Improved
8.48	102	0.300	0.0360	643.5	On the 10th day of sleep	
2.15	100	0.310	0.0200	762	On the 9th day after awakening	
12.4	104	0.350	0.0092	608.4	Before the narcosis	
8.92	78	0.300	0.0100	532	On the 5th day of sleep	Relative
11.6	128	0.380	0.0100	585	On the 6th day after awakening	improvement
9.8	111	0.120	0.0300	707	Before the narcosis	
13.2	109	0.220	0.0330	585	On the 2nd day of sleep	No
8.4	125	0.145	0.0350	585	On the 11th day of sleep	improvement
9.0	109	0.540	0.0180		On the 10th day after awakening	
10.6	94	0.340	0.00856	615	Before the narcosis	
9.48	97	0.290	0.0080	585	On the 4th day of sleep	Improved
6.6	129	0.270	0.0060	678	On the 6th day after awakening	
14.0	104			508	Before the narcosis	
12.0	104	0.300	0.0130	598	On the 4th day of sleep	No
7.93	89	0.360	0.0100	568	On the 7th day after awakening	improvement
7.12	104		0.0215	696	Before the narcosis	
8.5	112	0.190	0.0376	570	On the 2nd day of sleep	Improved
12.48	83	0.340	0.0190	585	On the 7th day of sleep	
12.6	97	0.200	0.0210	549	On the 15th day after awakening	
8.4	100	0.230	0.0140	535	Before the narcosis	Improved
6.96	137	0.250	0.0130	549	On the 3rd day of sleep	
7.85	102	0.320	0.0146	585	Before the narcosis	
10.28	91	0.300	0.0148	585	On the 3rd day of sleep	Slight
	137	0.340	0.0170	492	On the 7th day of sleep	improvement
		0.120			After awakening	
1.35	104	0.230	0.0290	555	Before the narcosis	
12.2	85	0.160	0.0160	515	On the 5th day of sleep	No
11.8	125				On the 10th day of sleep	improvement
12.6	120		0.0180	538	Before the narcosis	
10.8	86	0.223	0.0180		On the 11th day of sleep	Improved
	123	0.150	0.0200	597	After awakening	
8.6	130	0.350	0.0350	599	Before the narcosis	
8.2	107	0.240	0.0200	568	On the 8th day of sleep	
13.07	113			600	Before the narcosis	No
10.0	107			468	On the 2nd day of sleep	improvement
9.32	122	0.380	0.0160	555	Before the narcosis	
13.5	105	0.245	0.0100	566.6	On the 7th day of sleep	Improved
9.6	105	0.340	0.0120	643.5	On the 14th day after awakening	
12.1	86	0.230	0.0194	526.5	Before the narcosis	Improved
13.0	99	0.180	0.0219	827.5	On the 2nd day of sleep	

other blood elements which would be able to affect the white blood picture materially.

The monocytic curve changed much less strikingly; it rose somewhat between the fourth and sixth days, but even then we saw more than 10% monocytes in only one case. After this slight rise the number of monocytes decreased again.

With regard to the eosinophils we could demonstrate either their complete disappearance during the narcosis or a sporadic appearance of 1-2%. An eosinopenia like this is peculiar to many infections and toxic conditions. Case Ku. (no. 2) was an exception. After a decrease in the eosinophils in the first few days, there was a definite eosinophilia which reached 16% on the fifth day and then gradually sank, returning to the original values only after the end of the narcosis.

This case ran a somewhat different course from the others both with respect to changes in the morphological white blood picture and to chemical changes.

Leupold differentiates a group of schizophrenic cases in which the course of the psychosis brings with it alterations in the function of the autonomic nervous system. The cases with marked eosinophilia particularly led him to this idea. Possibly the eosinophilia in this case was to be ascribed to the autonomic disturbances which were obvious although with the other cases of disturbed autonomic regulation we could demonstrate no eosinophilia.

Regarding the sedimentation reaction of erythrocytes, it is known that this reaction is not specific for any particular disease or condition and that an acceleration in the sedimentation of erythrocytes may occur in different pathological states. Runge found an acceleration in practically all organic diseases of the central nervous system and also in schizophrenia.

Against the assertion that high sedimentation is to be found in schizophrenia, several authors (Wuth, Georgi, Riebeling and others) raise the objection that in a large series of schizophrenic patients a normal or even a delayed sedimentation rate was observed.

In most of our cases the sedimentation rate of erythrocytes showed low values before the narcosis (3-7 mm. per hour). With the beginning of the narcosis the picture changed considerably.

Usually on the first day, or at most on the second or third days, the sedimentation rate increased and this increase ran its course with variations. In most of the cases the greatest acceleration was found on the fifth to eighth days of the narcosis, but there was one case in which the sedimentation rate changed from 7 mm. per hour to 33 on the second day of the narcosis, and afterwards it showed a certain falling off; but at the end the rate was not less than 17 mm. per hour.

The influence of the narcosis on the blood morphology and on the sedimentation rate may be compared with that of a toxic state of the organism. In general we found corresponding changes in all the cases studied.

Blood Proteins and Protein Metabolism

(Amino-Acid and Polypeptide Nitrogen)

The question of the origin of protein is by no means settled. Protein is a colloid substance consisting of a more coarsely dispersed fraction, the globulins (to which fibrinogen also belongs) and a finely dispersed albumin fraction. According to various authors the total protein and its fractions have the following average values: total protein, 7-9%; Globulin 1-3%, albumin 4-6%. With a change in the ratio of the protein fractions, a shift to the side of the coarsely dispersed fraction, that is, a relative increase in the globulin, is recognized to be a systemic reaction of the body which is observed in all infections. Up to the present we have no clear explanation of the cause of the increase in the globulin fraction, but it is well known that it is to be seen in diseases in which there is degeneration and destruction of the cells.

As for the influence of prolonged narcosis on the protein bodies of the blood, the chief tendency is toward a decrease in the total protein and a lowering of the protein coefficient with a relative increase in the globulin. On the basis of our material it is hard to say on what day the maximal decrease in total protein is to be observed; we can only say that in some cases lowered values can be seen even on the first days of the narcosis and in others at the end of it: Once on the eighth day (Patient Ku., Case No. 2), 6.7% was found as compared with 8.14% before the narcosis; once on

the second day, 5.78% was found (Patient Tsche., Case No. 10); in this case there was also a low value before the narcosis, 5.99%.

With respect to the separate fractions it is certain that the globulin fraction in all cases, except in 2 cases (Patients Gr., case No. 7, and Jl., Case No. 14) showed a relative increase. One of the cases showed a remarkably high sudden increase of globulin (Patient Ku., Case No. 2), 5.5% on the eighth day of the narcosis as compared with the original 2.3%. It is interesting that in the same case the maximal fall of the total proteins was observed.

It is just as hard to say on which day the maximal increase in globulin takes place. We may say nevertheless that it occurs late, from the eighth day on. At any rate we could not observe particularly great changes in the globulin fraction before the fifth day.

In all our cases there was a decrease in the albumin fraction. The protein coefficient fell in all cases except 2 (Patient Ko., Case No. 1 and Patient Jl., Case No. 14), in one of which there was a rise in the protein coefficient on the eighth and in the other on the eleventh day.

In some cases, for example in case No. 2 (Ku.), the protein coefficient fell from an original 2.53 on the eighth day of the narcosis to 0.21 indicating radical disturbances in the domain of the protein bodies.

How soon does the protein picture of the blood return to normal after the end of the narcosis? In Case No. 1 (Ko.) on the fifth day after the end of the sleep not all the protein values had yet returned to their original level. Indeed, the globulin fraction was not normal until the eleventh day.

Our other observations, made on the ninth, tenth, fifteenth and eighteenth days after the awakening, gave evidence that the return to the original blood protein values took place between the eleventh and fifteenth days after the awakening; in cases Tsche. (No. 10) and Gr. (No. 7) almost the original values were seen on the eighteenth day. In the latter case the globulin value somewhat exceeded the original one on the eighteenth day,—2.72% as compared with 2.31%, while the albumin had not yet returned to its original value.

Thus we witnessed great and similar changes in the blood proteins in the course of the prolonged narcosis, a lowering in the total protein along with a relative increase in the globulin and a definite fall in the protein coefficient. These changes reached their

peak on the last day of the narcosis (the tenth or eleventh day); the return of the protein coefficient to normal did not occur before the fifteenth or eighteenth day after the awakening.

With regard to the question whether an influx of fluid from the tissues into the blood or an actual disintegration of tissue protein is at the root of these changes, we incline to the latter view. This is all the more likely, since there are both qualitative and quantitative changes. Increases in globulin are particularly likely to occur in diseases which produce degeneration and destruction of the tissues.

We referred above to a work of Schriewer who is of the opinion that in prolonged narcosis we are dealing with a stimulus therapy insofar as there results as resorption of the protein broken down under the influence of the narcosis. The ratio of the amino acids and the polypeptides of the blood also argues in favor of a breakdown of proteins. If one assumes that in the norm the amount of amino acids is 7-11 mg.% and that of the polypeptides 1-4 mg.% then one sees that in our cases the variations were just within normal limits before the narcosis. On the other hand, during the narcosis in 13 cases out of 14 the amount of amino acids was increased, and this increase was levelled off by the third to the fifth day. The maximal rise was in the case of Gr. (No. 7) and occurred on the second day of the narcosis, 13 mg.%.

As for the polypeptides, in almost all the cases in which an increase in amino acids took place there was also a rise in polypeptides, except for case Tsche. (No. 10) in which there was a slight fall in polypeptides. A maximal rise in amino acids, 13 mg.% could be observed in Gr. (No. 7) on the second day of the narcosis and was particularly impressive after the awakening on the fifteenth day. In Case 10 the original value of the polypeptides was 4.5 mg.%; on the second day of the narcosis this fell sharply to 0.9 mg.%, rose again until it was 4.0 mg.% on the seventh day, and fell after the awakening on the fifteenth day to 2.94 mg.%. Case 15 (Sa.) showed a particularly great increase. On the eighth day of the narcosis the value had risen from 3.38 mg.% to 9.2 mg.%.

Thus the increase in the amino acids and polypeptides of the blood corresponds to the protein changes and points to a breakdown of protein in the body in the course of the prolonged narcosis.

What sort of connection is there between the increased breakdown of proteins in the body and the biological mechanism of the narcosis itself? Here two explanations are possible (Schriewer). The increased breakdown of protein may either be a side effect of the prolonged narcosis, the result of its toxicity and without any direct relation to the therapeutic action, or there is another possibility: the breakdown of the protein (its intensity) is in direct relation to the therapeutic results of the prolonged narcosis as a definite expression of the stimulation therapy.

Our observations do not bear out the latter view since we were not able to see any essential therapeutic effect in a number of our patients in whom the protein alterations were quite marked. Therefore it is to be considered primarily a toxic factor.

Sugar, Potassium, Calcium, Rest Nitrogen and Bilirubin

The sugar content, which was tested daily during the narcosis, did not show any great fluctuations, except that hyperglycemia was seen in two cases (Bl., No. 13 and Sa., No. 15) two days after the beginning of the narcosis (142 and 140 mg.% respectively) and in one case (No. 7) on the fifth day (147 mg.%).

As for hypoglycemia, in case No. 8 the blood sugar fell on the second day of the sleep to 59 mg.% but rose on the next day to 89 mg.%; in a second instance there was a rather sporadic hypoglycemia (Case No. 3) in which the blood sugar fell from 93 mg.% to 64 mg.% on the eighth day and rose the next day to 114 mg.%: in a third case (No. 2) the blood sugar fell to 68 mg.% on the third day after the awakening but rose suddenly the next day to 148 mg.%.

In all the cases there was a more or less significant hyperglycemia at the awakening. In one half of the cases it varied between 120 and 140 mg.%, in the other between 140 and 170 mg.%. Usually this did not last long, one or two days, and fell with the condition of confusion, the combined speech and motor excitation, which occurred in most of the patients on awakening.

To elucidate the effect on the blood sugar of the glucose given to the patients in the course of the narcosis in the form of 50 grams of a 4% solution by rectum, we carried out dynamic studies on four patients with respect to the sugar content of the blood. A hyper-

glycemia could not be demonstrated in a single case. The maximal rise in 3 out of the 4 cases was apparent in 1½ hours and in the fourth case in 1 hour after the glucose administration.

The following results were obtained in the blood sugar determinations after the administration of the glucose:

1. Gr., Case No. 7. Before the administration of glucose the blood sugar was 75 mg.%; 30 minutes after glucose was given, it was 79 mg.%; 1 hour after, 100 mg.%; 1½ hours after, 97 mg.%; 2 hours after, 82 mg.%.

2. Jak., Case No. 8. Before the glucose administration, the blood sugar was 89 mg.%; 30 minutes after glucose was given the blood sugar was 86 mg.%; 1 hour after, 82 mg.%; 1½ hours after, 102 mg.%; 2 hours after, 84 mg.%.

3. Schu., Case No. 9. Before glucose was given, the blood sugar was 104 mg.%; 30 minutes after the glucose, the blood sugar was 106 mg.%; 1 hour after, 109 mg.%; 1½ hours after, 122 mg.%; 2 hours after, 109 mg.%.

4. Sa., Case No. 15. Before glucose was given, the blood sugar was 81 mg.%; 30 minutes after glucose the blood sugar was 82 mg.%; 1 hour after, 79 mg.%; 1½ hours after, 104 mg.%; 2 hours after, 73 mg.%.

The potassium content in 11 cases out of 18 diminished in the early days of the narcosis, but without passing the lower limits of normal values. In the other 7 cases it rose somewhat, without exceeding the upper limits of normal. In case No. 7, Gr., where the potassium value was rather high, 24.76 mg.%, before the narcosis, it fell on the third day to 17.32 mg.%, rose on the eleventh day to 20.5 mg.%, and on the 29th day, or the eighteenth after the end of the narcosis, it again reached 24.92 mg.%. In the same case we saw the opposite behavior in the calcium: on the third day its value rose from 9.8 to 13.2 mg.%, fell on the eleventh day to 8.4 mg.%, and on the eighteenth day after waking it was 9 mg.%.

In those cases in which we succeeded in following the ratio of potassium and calcium to or past the eighteenth day after waking, we found values similar to those before the narcosis.

In case No. 1 (Ko.) where the level of the electrolytes was tested, the value was lower on the sixth day after waking than before the narcosis.

The amount of rest nitrogen increased in all the cases from the very first day of the narcosis without, however, reaching pathological values. At the end of the narcosis and for the first few days after waking, the rise continued in 11 out of 18 cases; in 5 cases there was an insignificant fall. In case No. 7 (Gr.) the rest nitrogen was 40.12 mg.% before the narcosis; on the second day it amounted to 47.5 mg.%, on the eleventh day to 47.9 mg.%, and on the eighteenth day after waking it was 50 mg.%.

As for the bilirubin, we started with the hypothesis that the liver must react to the administration of narcotics, and consequently we expected an increase in the amount of bilirubin. In our material, however, the bilirubin rose somewhat in only 2 cases (No. 7, Gr., and No. 16, Dm.). The highest value was 0.95 mg.%.

At the close of this chapter we should like to touch on the question to what extent one can correlate the effectiveness of the treatment with the humoral changes observed.

With our material as a basis we can make no generalizations. For example, there were protein alterations both in the cases that showed a good therapeutic effect and in those that did not, and the changes in both were equally extensive. Compare, in the table, Case No. 1, Ko., with a satisfactory result from the treatment with Case No. 2, Ku., where there was no effect. To a certain extent this is also true of the other biochemical alterations.

Bromide, Iodide and Chloride

In consideration of the fact that in 1936 we took part in the investigation of the iodide and bromide metabolism in schizophrenia, we decided to find out to what extent prolonged narcosis influenced the behavior of the haloids, especially bromide, which, according to Zondek, is connected with the state of sleep. We undertook the study of the iodide-bromide metabolism in the prolonged narcosis in patients with schizophrenia treated with Cloetta's Mixture and in addition conducted experiments on dogs subjected to prolonged narcosis with this mixture.

In our work[1] which is especially devoted to the iodide-bromide exchange we take the stand that the alterations of the bromides in

[1] Dr. A. E. Kulkow and Dr. B. E. Kakusina—Über den Brom-Jodumsatz bei der Schizophrenie. II. Mitteilung. (In preparation.)

the organism are analogous to those of the chlorides and that the bromide level in the blood is dependent chiefly on alimentary factors. Neither we nor other authors (judging from the most recent works) have been able to point to a direct relation between the bromide level and particular psychic states.

The existence of a special center (hypophysis?) which governs bromide metabolism in the organism must be taken as very doubtful.

The bromide variations which we observed in our patients are rather to be explained by exogenous factors such as the administration of foods and medicines which may contain certain amounts of bromide.

In the main, the fall in the bromide content during the prolonged narcosis is due to the relative hunger of the organism and the associated increased excretion of chlorides, the behavior of which is regulated by the bromide changes in the organism.

If we follow the bromide content in the blood (determined according to Indovino), as it is shown in our table, then it is evident that during the narcosis the bromide content shows a tendency to fall, especially toward the end of the narcosis. In the first few days the bromide is increased in several of the cases. In 8 cases the amount of bromide falls very low. In 2 of them this happens on the second day of the narcosis (No. 8 and No. 3), but in the others at the end of the narcosis as stated above.

It is interesting that along with the fall in the bromide content of the blood during the sleep there was also a fall in chlorides.

For illustration we shall take case No. 4 with a bromide value before the narcosis of 0.36 mg.%, and 0.3 mg.% on the fourth day; a chloride value of 532 mg.% before the narcosis, and 497 mg.% on the fourth day. In another case, No. 5, we see the following changes in the amount of bromide: before the narcosis, 0.42 mg.%; the first day of the narcosis, 0.23 mg.%; the tenth day, 0.3 mg.%; on the ninth day after waking 0.31 mg.%. Consequently, we have here a fall in the bromide during the narcosis and a certain consecutive increase after the awakening. We can observe a similar picture in several other cases which we shall not give in detail. (See table.)

Along with the study of the bromide changes in man under the influence of Cloetta's Mixture, we undertook experimental research on the question as to how the bromide behaves in animals to which Cloetta's Mixture in a certain dose (0.3 per kg. of body weight) was

injected intramuscularly several times daily. The mixture caused a more or less deep sleep in which the animals (dogs) remained for 1-9 days. In the dogs upon which we were experimenting we determined the bromide content of both the blood and the cerebrospinal fluid on various days during the narcosis. The experimental animals were given glucose as food. Our studies included the observation of the dynamic changes in 2 dogs. In general there was a certain tendency toward a fall in bromide during the narcosis. For example, the following values were found for the dog Jack: blood bromide before the narcosis, 0.24 mg.% (26.VII); during the narcosis, 0.12 mg.% (27.VII), 0.22 mg.% (31.VII), and 0.145 mg.% (2.VIII). Here there is a definite tendency toward a fall in the bromide and a certain sudden rise which obviously was connected with alimentary factors. The bromide content of the cerebrospinal fluid varied correspondingly with the blood except that the absolute values were higher (0.26, 0.18, 0.23, and 0.2 mg.%). In the same dog the chloride content of the blood before the narcosis was 633 mg.% (26.VII); on the first day of the narcosis it was 498 mg.% (27.VII); later 486 mg.% (31.VII) and 422 mg.% (2.VIII).

In the cerebrospinal fluid higher chloride values were observed, their changes varying as those of the blood (760, 644, 585, 620 mg.%). The chloride in the cerebrospinal fluid as well as in the blood showed a fall which paralleled the fall of the bromide, confirming our statement in our other work that the bromide content of the blood is intimately dependent on the behavior of the chloride in the organism.

We shall not give the results of the other experiments in detail; in general they tended in the same direction as the just mentioned experiments.

With respect to iodide, which we determined according to the method of Elmer both for our narcotized patients and for the experimental animals (dogs), we refrain for the time being from any sort of generalizations and merely present our results. This is to be explained by the fact that the changes in iodide content during narcosis tended in different directions. The facts about the metabolism of iodide in the patients are recorded in the table.

The results with our experiments in dogs are given together with the bromide values in the dog "Jack" referred to previously. Before the narcosis the iodide content of the blood was 0.042 mg.%,

of the cerebrospinal fluid, 0.036 mg.%; after the beginning of the narcosis the iodide in the blood and the cerebrospinal fluid fell: blood iodide to 0.031 mg.%, cerebrospinal fluid-iodide to 0.027 mg.%. During the following days the values were almost the same for the blood and the spinal fluid: blood—0.038 mg.%, spinal fluid—0.039 mg.%. Afterwards there was another fall in both the blood (0.035 mg.%) and the spinal fluid (0.030 mg.%).

These findings indicate a definite alteration in the iodide content under the influence of Cloetta's Mixture. In considering the relatively high iodide values in the cerebrospinal fluid during the narcosis we may speak of a disturbance of the integrity of the barrier between the blood and the cerebrospinal fluid.

Apart from the blood changes described above, ketonuria was observed in all our patients, in some even on the second day of the narcosis. This sudden appearance of acetone is not to be explained by hunger, but, we assume, that it is more correct to seek the cause in the toxic effect of the narcotic preparation and only secondarily in the influence of hunger.

Summary

In our study of the humoral changes in our patients with prolonged narcosis (Cloetta's Mixture) we may provisionally point out the following results:

1. The morphological blood changes show most strikingly in the number of leukocytes and in the shift to the left in the leukocytic equilibrium, with esinopenia and neutrophilia.

2. The sedimentation reaction of erythrocytes showed a rise in all the cases but not always of the same degree.

3. The changes in the protein content and protein metabolism present themselves as follows: in most of the cases there was a decrease in the total protein, in the albumin content and the protein coefficient with a synchronous increase in the globulin fraction, the amino nitrogen and the polypeptides. These changes we ascribe primarily to the toxic effects of Cloetta's Mixture.

4. We did not succeed in establishing any correlation whatever between the effectiveness of the treatment and the changes in the proteins and protein metabolism; one can only point out that the changes in the protein content and protein metabolism were quite

marked both in the cases where there was a therapeutic effect and in those where there was none.

5. The sugar values varied during the narcosis within the limits of normal, but in individual cases there were sporadically hyperglycemia and hypoglycemia. Upon the awakening the sugar values showed a definite rise, especially in the cases where the awakening was ushered in with confusion and excitement.

6. In most cases the potassium values fell during the first days of the narcosis but did not pass the lower limits of normal. The calcium showed a certain tendency to rise, but not an equal rise in all cases, nor on the same days of the narcosis.

7. The bromide content fell in most of the cases during the narcosis: near the end of the narcosis and especially after its ending the bromide rose to its original level.

8. The chloride content ran almost constantly parallel to the bromide content. These changes in the bromide and chloride contents we are inclined to think, are to be ascribed rather to a certain state of hunger of the organism (increased excretion of chlorides) than to the narcosis.

9. With reference to the iodide we could not see any regularity; in some of the cases there was a rise in the iodide content during the narcosis and in others there was a fall.

43. A SPECIAL GLIAL ALTERATION AFTER REPEATED INSULIN SHOCK IN ANIMALS

VLADIMIR NICOLAJEV [1]

The study in question was taken up for the observation of a possible vital staining of the central nervous system (in case the barrier were broken down by the insulin shocks?): various vital stains were used. The animals were 30 white rats; 18 of these had been subjected to repeated insulin shocks, and the others were used as controls.

The state of the neuroglia was what attracted our attention in the histological examination. The control animals regularly showed proliferation and some of them marked activation of the glia but

[1] State Institution Gintermuischa, Jelgava, Latvia. Director: Dr. K. Neuberg.

no ganglion cell alterations. In other organs, especially the liver and spleen, a general reticulo-endotheliosis was demonstrable.

In the animals that had been given insulin shocks the following observations were made: in the liver there were foci of necrosis in varying number. In the brain such foci were frequent, and also there appeared ganglion cell degeneration which sometimes preferred the striatum, sometimes the cortex. Since this is already well-known, I merely mention it in passing. A further finding was the peculiar glial alteration which seemed quite independent and without relation to a visible parenchymal disturbance.

In all our insulin cases the glia tended throughout to a regressive change, especially after severe shocks and in the fatal outcome of the same. If the insulin shocks were interrupted early and so repeated over several days, and if the animals were killed before the comatose terminal stage, the regressive alteration of the glia was much smaller or only partially demonstrable. In that case a progressive factor emerged which might even dominate the picture: the glia cell nucleus was considerably, often quite noticeably enlarged, although it was poor in chromatin and sometimes very irregular. This glia phenomenon could in certain cases increase to the point of a so-called atypical glial transformation. And yet it is certain that the atypical neuroglia, this remarkable product of progressive and regressive alteration occurs otherwise only in certain metabolic disturbances, notably with insufficiency of the liver. We do not believe that in our cases the essential progressive factors could arise from the vital stain since the glia activation connected with the general reticulo-endotheliosis almost always affected only the micro- and oligodendroglia, but the tendency to atypical transformation definitely preferred the macroglia. It seems rather that with more prudent but longer administration of the insulin, corresponding somewhat to the usual hypoglycemic shock treatment, the glia first gets into a condition which may be designated as morphologically progressive and that the injury of the glia follows very soon or immediately thereafter, impresses its mark on the progressive glia, and thus produces morphologically intermediate stages between the atypical and actually regressive glia cell pictures.

Conclusion: The visible tendency of an independent glial transformation that may lead to atypical forms permits one to assume the

effect of a metabolic disturbance in repeated insulin shocks, a disturbance which attacks the central nervous system in this particular way before other visible parenchymal changes occur. Since we may take it as proved (cf. Virch. Arch. 299, 1/2) that a disturbance in liver function plays a part in the origin of atypical glial forms, the assumption of a disturbance in carbohydrate metabolism naturally follows. Here, of course, it is not hepatogenic but is due to the insulin hypoglycemia.

44. THE PROGNOSIS WITH THE INSULIN SHOCK THERAPY AND THE INTERPRETATION OF THE PROCESS OF RECOVERY

(STUDIES OF BARRIER PERMEABILITY AND SPINAL FLUID PROTEIN)

V. NICOLAJEV

(WITH THE COLLABORATION OF DR. R. WERNER, CHIEF OF STAFF [1])

If the schizophrenia has been evident for some months and is no longer acute, the best outlook for remission is offered by those forms of the disease in which the barrier permeability is lowered (permeability quotient for bromide above 3.5 or even above 4.0). And yet the prognosis is almost as favorable in stuporous catatonic patients although experience shows that in the first part of their illness they exhibit diminished permeability far more seldom than excited or paranoid cases.

Explanatory Excursus. On the basis of an extensive material embracing 967 determinations, which has already been published in part (Z. Neur. 157, 2), we hold that the frequent lowering of the barrier permeability in schizophrenia is best interpreted as a mode of reaction inherent in the schizophrenic constitutional type, appearing at the onset of the schizophrenic process or a little later and usually persisting for some time. The low permeability often ushers in a spontaneous remission, more commonly, however, the schizophrenic defect stage. Usually the permeability becomes normal later, although it may remain low for a long time after the psychosis has apparently run its course.

[1] From the State Institute Gintermuischa, Jelgava, Latvia. Dr. K. Neuberg, Director.

A rise in permeability is to be found more seldom during schizophrenia and is usually associated with a pathological increase in the total protein of the cerebrospinal fluid (due to an increase in the albumin). The fall in permeability more commonly found is associated in about 80% of the cases with a pathological increase in the spinal fluid globulin as well as in the protein quotient. It is our opinion therefore that a rise in globulin and a fall in permeability are associated genetically in schizophrenia; that the schizophrenic process which is somatogenic (rather than encephalogenic) causes damage to the parenchyma—which is at first reversible—and the formation of pathological decomposition products; and furthermore we believe that the decrease in permeability is an attempt on the part of the organism threatened with schizophrenia to shield the brain from the schizophrenic process.

In connection with the insulin shock therapy the following results were obtained. We have made 88 tests in 26 cases of schizophrenia before, during and after the treatment.

The favorable cases studied were the acute ones and those with prompt remission or remission after a brief shock phase. Upon recovery, the permeability which had almost always been found low returned to normal or almost to normal; the globulin content, which had been increased, usually fell considerably ("simple inactivation").

With prolonged treatment the globulin content of the cerebrospinal fluid almost always rose, and the protein quotient often became considerably higher. In contrast to the usual change already mentioned, an increase in the permeability of the barrier was sometimes noted, or at least the usual thickening failed to appear. This relaxation of the barrier was only slight or absent altogether in patients who did not go on to remission or showed their first improvement very late. If the treatment were successful in the end, the permeability might return to normal even though it had been definitely diminished in the shock phase. This late rise in permeability was most common when there was no further increase in globulin ("delayed inactivation" following intensification of the process).

Cases treated without success showed one of the following two pictures. The thickened barrier might become thin again with no increase in protein. This change was interpreted as due to the inac-

tivation of the schizophrenic process with persistence of the defect already present. Or there might be a transient relaxation of the barrier, likewise with no increase in globulin, which, after the shock phase, reverted to a lasting state of low permeability. Possibly this change indicates a schizophrenic process inaccessible to insulin, with the defect preponderant.

Provisional Conclusions (the studies are being continued; a detailed report will follow). Schizophrenia is a somatogenic process of the central nervous system affecting particularly the schizophrenic constitution. Sooner or later there is a lowered permeability of the barrier between the blood and cerebrospinal fluid. This defense is however seldom able to counteract the effect of the somatogenic noxae upon the nervous system. More frequently the lowered permeability is accompanied by a pathological rise in globulin— a sign of damage to the parenchyma, which is at first reversible but later irreversible and is explicable on the basis of a disturbance in metabolism. There is much to say for the view that the typical symptoms of schizophrena may be due to just this fall in permeability and that these symptoms do not come to light in a different constitutional framework and in the absence of a certain mode of reaction. This view is confirmed by the frequent occurrence of decreased permeability, for instance, after encephalitis and after the malaria treatment for paresis in cases with a negative serology (pictures analogous to schizophrenia). We need only to recall that here too somatogenic poisons arising from certain metabolic disturbances may exert an action upon the barriers of a brain that is seriously afflicted. Still the assumption of a pathological state of the endocerebral mesenchyme is not easy to prove.

The insulin shock therapy attacks the morbid process of schizophrenia in some such way as this. It usually increases the preexistent thickening of the barrier, almost always in the cases that recover. The increase in the globulin of the cerebrospinal fluid suddenly ceases. The somatogenic metabolic disturbance of the neurons of the brain parenchyma is somehow taken care of. In cases treated for long periods when the globulin content of the spinal fluid rises markedly and at the same time the relaxation of the barrier is delayed or completely absent, the shock treatment is seldom or never able to influence the pathological state of the nerve cells and restore their normal metabolic processes. In such cases

there may be further disintegration of cells, an outcome that is not entirely undesirable. For perhaps the morbid process can be inactivated only at the cost of such a sacrifice, and in this way only can the clinical state show some degree of improvement. There remains only to point out that cases running their course with restoration of the normal permeability afford no possibilities for the insulin therapy.

Brief summary: The shock treatment affects non-specifically the brain and inactivates the morbid process there. Whether it also acts on the somatic *causa morbi* is not known. Certainly the inherited schizophrenic constitution remains unaffected. At any rate it is of great value to possess a tool with which we can remove an important link in the pathogenetic chain, the reactive process in the brain.

45. EARLY EXPERIENCES WITH SAKEL'S HYPOGLYCEMIC INSULIN TREATMENT OF THE PSYCHOSES IN AMERICA

JOSEPH WORTIS [1]

Although leading American psychiatrists were acquainted with Sakel's work as early as two years ago, it has only been within the past few months that the work has been introduced on a large scale in America. Aside from the natural scientific scepticism which was to be expected, especially towards work which was being done so many thousands of miles away, a more important reason for the scepticism with which even Müller's confirmatory reports were received, is the wide prevalence in America of a psychogenetic approach to the study of psychoses. American psychiatry in recent years has been willing in theory to reserve a place for the organicists but insisted in practice on an almost exclusively psychogenetic attitude. Thus it was that the earliest report on Sakel's work was at first rejected by a leading neuropsychiatric journal, only to be published after a delay of almost a year and a half by the enterprising editor of the Journal of Nervous and Mental Disease—Dr. Smith Ely Jelliffe. Dr. Sakel's own arrival in America at this time quickened the growing interest, which some unfortunate and premature press releases threatened to fan into a conflagration. Through the

[1] Bellevue Hospital, New York City.

solid and sympathetic support of three eminent psychiatrists however—Dr. Brill, Chairman of the Section of Neurology and Psychiatry of the N. Y. Academy of Medicine, Dr. Parsons, State Commissioner of the Department of Mental Hygiene of New York, and Dr. Adolf Meyer of John Hopkins University—, the work was led into the proper channels, and the first preliminary reports on January 12 of this year at the N. Y. Academy of Medicine—by Cameron, Glueck, Ross and ourselves—created a decidedly favorable and auspicious atmosphere.

Meanwhile Dr. Sakel undertook to instruct a large group of representative young physicians from the State Hospitals of New York in the new technique, while Drs. Cameron and Hoskins at Worcester State Hospital, ourselves at Bellevue, and no doubt Dr. Katzenelbogen at Meyer's Clinic, demonstrated the work to a growing number of interested visitors.

Practically all the reports to date have been confirmatory. At the American Psychiatric Congress held at Pittsburgh early this month, reports on a total of over 500 cases were made from over a score of hospitals throughout the country. The degrees of enthusiasm varied, but no one rose to intrude a single dissenting note. At the same time there is a varied and impressive variety of research activity under way, and we can expect that America with its enthusiasm and technical resources will soon uncover some of the secrets contained within this work.

The Pittsburgh meeting probably marks the official introduction of the Sakel method to American Psychiatry. From now on the work will have to consist of a slower and more systematic evaluation of results, and a slow but thorough study of all the new special problems that have turned up. The excesses of enthusiasm have perhaps already caused several unnecessary fatalities, and some effort will be made to keep the work in well trained hands. Frostig's "Tentative Standard Procedure" should shortly appear in translation and Sakel's book is also due to appear in English soon. We American psychiatrists look forward to a free interchange of experiences and ideas across all national borders, and hope that the international character of this gathering is a harbinger of further international collaboration in this and other fields.

46. THE SURGICAL TREATMENT OF DEMENTIA PRAECOX

FERDINAND MOREL [1]

Surgical intervention in various psychoses has recently been attempted by some neurosurgeons both here and abroad.

At the end of 1935 and in the early months of 1936 Moniz has made use of two operations of his own, both of which are concerned with the centrum ovale of the right and left frontal lobes. He began by injecting absolute alcohol into these regions; then he isolated by excision portions of white matter one centimeter in diameter. In some cases he combined the use of alcohol and excision.

Twenty patients were treated in this manner, and their histories were reported several months later by Moniz himself in his work: "Tentatives opératoires dans le traitement de certaines psychoses, Paris, 1936." Among these 20 patients of Moniz there are men and women of widely varying ages with very diverse mental diseases. As concerns the consequences of the procedure they, of course, will be seen later. On the other hand, certain immediate effects were noted by Moniz as practically constant. Very brief trismus lasting a few minutes, fibrillary twitching in the region of the masseters, anisocoria with diminution or even transitory absence of the pupillary light reflex, certain disturbances of sphincter control, which are likewise transitory, diminished restlessness whenever restlessness was present, and finally a whole series of disturbances which are called apathy, akinesia, loss of initiative, posing, mutism, and disturbances of orientation for place and especially for time.

This is a brief summary of the most frequent signs observed by Moniz. They would gain in interest if we knew exactly the pathway from the centrum ovale which was previously sclerified by alcohol or excised.

The case I wish to report to you is very different. The patient is a young man of 23 with a very old hebephrenic-catatonic syndrome, for which Dr. Ody of Geneva had done a resection of the right frontal lobe exactly 14 months ago. I had an opportunity to see this patient for the first time after this operation, never having met him before. Afterwards I examined him several times, the last

[1] Geneva Psychiatric Clinic, Bel-Air. Prof. Charles Ladame.

time 15 days ago. I am grateful to Dr. Ody for permission to describe before you a case unique in my experience.

I can give only a brief summary of the history preceding the operation. There was no known cerebral disease in the antecedents or collaterals. The patient himself was in asphyxia at birth. He walked at 13 months and talked a little later. He always had a slight strabismus. At the age of 2 he had a mild febrile illness with disturbed sleep and restlessness for 3 to 4 days.

Symptoms of the psychosis began to appear very precociously at about the age of 4 or 5 and seemed at once to be chronic. There were grimaces, stereotypy, compulsions, but no diplopia or salivation. He was disagreeable and emotionally unstable and would not tolerate contradiction. He went to school but proved incapable of the simplest reasoning. Nevertheless he developed an exceptional memory and astonished his teachers by telling them after a few seconds of calculation on what day of the week any given date fell.

His condition grew progressively worse. A whole symptomatology of hebephrenic catatonia appeared more and more clearly. He was given the different treatments used at that time: pauglandine, sedobrol.

About the age of 12 his mental development seemed to be completely and definitely arrested and the syndrome established. He no longer smiled, no longer talked except in a highly manneristic fashion, showed no initiative except to run to the cellar continually and hide. In bed he stood up or covered his head. Sometimes he made violent assaults on his mother and would raise his hand or even a knife against her.

According to his parents' story he remained exactly in this state until his operation by Dr. Ody, April 6, 1936. A resection of the right prefrontal lobe was performed along a vertical plane passing a few millimeters in front of the ascending frontal artery, the head of the caudate nucleus, the frontal horn of the ventricle and the genu of the corpus callosum.

I saw the patient 17 days after the operation. He was as well oriented as before. There was no additional disturbance of memory. He seemed to retain recent events about as well as before.

According to his parents he shows greater initiative than he has shown for a long time. For example, he invites his parents to be seated: he smiles at them, thus surprising them greatly, he begins

conversations; he no longer stands for long periods, and he crosses and uncrosses his legs when he sits. By all these signs he gives the impression of noteworthy improvement. He shows no defect whatever which could be attributed to the operation.

In the course of further examinations I endeavored first to study the complications that might have resulted from the resection of the right frontal lobe. My study was made more difficult by the chronic state of cerebral disorganization in the patient, especially by a slight and very old deviation of the head which appeared to be variable and which I was inclined to attribute to his negativism. Nevertheless a methodical study showed no constant deviation in the extremities nor in the body during walking, no Romberg, no spontaneous nystagmus. When he was asked to close his eyes and describe a semi-circle on an 80 cm. line, first with one arm, then with the other, there was a tendency especially with the right arm to make the movement too short and flat. This tendency has been noted by Weiss in patients with frontal deficiency. The vestibular pathways have not yet been studied in greater detail and no mechanical tests have been used.

The patient's balance seems not to be disturbed more than before. He returned to bicycling, which he had given up long ago, and did not fall.

Nor did any motor disturbance appear, or any special awkwardness such as is associated with picture of frontal apraxia.

The pupils are equal and their reflexes equal.

The cutaneous reflexes have undergone some modifications. For example, the palm-chin reflex, which was present just after the operation, has since disappeared. On the other hand, the abdominal cutaneous reflexes on the side opposite to the frontal lesion have increased in amplitude.

No gastric, intestinal or sphincter disturbance has been noted as following the resection.

The difficulties and surprises met with in testing the memory of a schizophrenic patient are well known. There was no memory defect that seemed to be attributable to the frontal resection. The name lists and the mnemonic agility which astonished his teachers remained intact.

As to different sorts of initiative, his family and friends find them more numerous and give precise examples. Such a change is more

or less frequently found in the course of dementia praecox, and it would be unwise to seek explanation in the frontal resection.

The violence which the patient's mother had such reason to fear, has reappeared from time to time.

By all accounts one would be tempted to conclude that the resection of the frontal lobe in this case of dementia praecox coincided with an amelioration in his general condition although the underlying process persisted. On the other hand, this resection produced



FIG. 1.

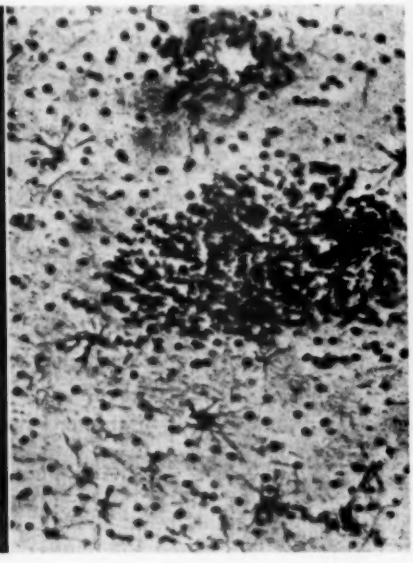


FIG. 2. White matter of F. D. m. glial stain. Magnified 313 times.

no noteworthy damage with the possible exception of two epileptic seizures that have recently occurred. They are evidently to be imputed to the operation.

This case has the value of a crucial experiment. It is unique, but the data are relatively simple. It proves at least that this operation produces neither apathy nor akinesia nor loss of initiative nor disorientation, which, on the contrary, often accompany the much less radical but bilateral operation of Moniz.

The histological examination of the specimen obtained at operation was of very great interest. Every one knows how rarely we see the brains of young patients with dementia praecox who have

met sudden death. But here, although there was no intercurrent disease, there was the operative procedure which has affected the tissues in its own way.

The pia mater is fine and delicate, but here and there shows fresh echymoses doubtlessly due to the trauma of operation (Fig. 1).

The rest of the tissue, especially the white matter, but also the portion lying under the pia mater, shows tiny petechiae due entirely



Fig. 3. Second and third layers of F. D. m. Nissl. Magnified 410 times.

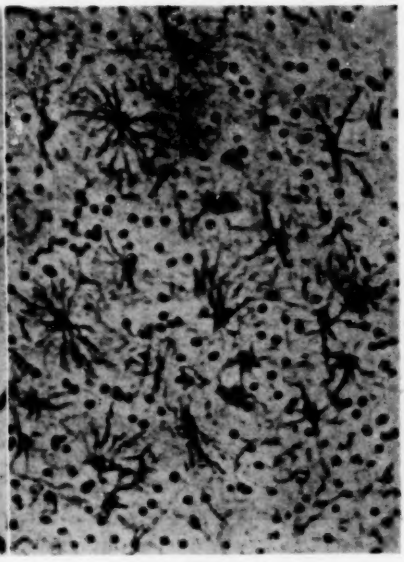


Fig. 4. Corona radiata. Astrocytes. Magnified 313 times.

to mechanical extravasation of red cells, with no lymphocytic or polymorphonuclear reaction nor any reaction of the surrounding glia. The cells sometimes remain in the perivascular spaces and sometimes break out into the nerve tissue where the myelinated fibers are lightly pushed away or parted with no secondary reaction of degeneration (Fig. 2).

Furthermore, there is edema of the nerve cells in separate groups. Fig. 3 represents this picture in the second and third layers of the F. D. m. region. It is only nerve cells that show this modification. Neither the neuroglia cells, nor the interstitial tissue, nor the peri-

vascular spaces are thus affected. It is a local circumscribed phenomenon in which the mechanical effects of the operation have probably played a rôle.

Fig. 4 shows the astrocytes of the corona radiata. There are islands showing considerable alteration. The cell bodies appear monstrous and their prolongations extend very far in an irregular, coarse and asymmetrical manner.

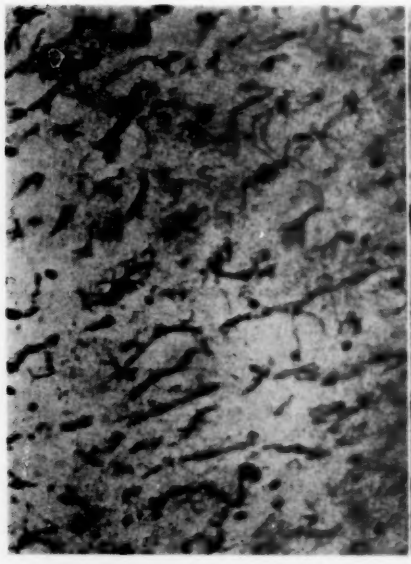


FIG. 5. F. B. superficial layers. Microglial method. Magnified 207 times.

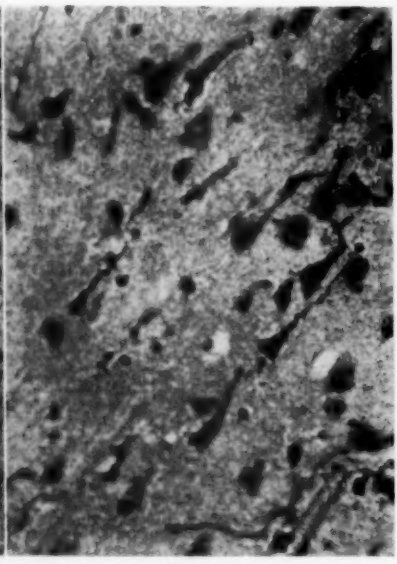


FIG. 6. F. D. m. fifth layer. Nissl. Magnified 313 times.

The microglia are not conspicuous for the large size of the cell bodies nor for their prolongations, which are relatively fine (Fig. 5). There are no cells with Nissl bodies.

Finally Fig. 6 shows some of the various appearances which may be assumed by nerve cells, especially hyperchromic, reticular and cork-screw forms. These stages of advanced sclerosis of the nerve cells appear in isolated areas, a fact which we have already noted in other cases of dementia praecox.[1]

[1] We are indebted to the extreme kindness of Prof. Amédée Weber and his co-worker, Mr. Gérard Baumann for the excellent microphotographs of our preparations.

V. COMMUNICATIONS AND DISCUSSIONS

1. Saturday, May 29, 1937

47. CORBERI (MILAN)

Professor Arturo Donaggio of the neuropsychiatric clinic of the Royal University of Bologna had his students Jedlauski and Zerbini make a histological study of the nervous centers of animals treated with insulin in shock-producing doses, and with cardiazol.

He found histo-chemical modifications which were revealed by the specal method of Donaggio, the fibrous tissue method, and not by the usual methods of examination.

The modifications are localized particularly in the forebrain.

Donaggio holds that they are reversible.

48. M. GROSS [1]

In our very detailed phosphorus studies which we carried out on the tissues of animals and the blood of patients treated with insulin, we found that there is a great difference in the phosphorus content of the blood plasma and that of the cellular elements. With this separate study of the plasma and the erythrocytes we could estimate what takes place in the cells, of which the erythrocytes merely represent a special case. While the inorganic phosphorus in the plasma diminished in the hypoglycemia, it seemed that the lipoid- and non-lipoid organic phosphorus were subjected to great variations in the erythrocytes. The same was true also with cardiazol.

These findings led us—alas, only very recently—to investigate other substances in the same way. The few results are still not uniform but afford the conclusion that an extensive dissociation sometimes exists, in regard not only to the blood sugar, but also to urea and chlorides.

This seems especially interesting with respect to chlorides because we almost always observe profuse sweating and frequently also

[1] Les Rives de Prangins. Director: Privat-Docent Dr. O. L. Forel.

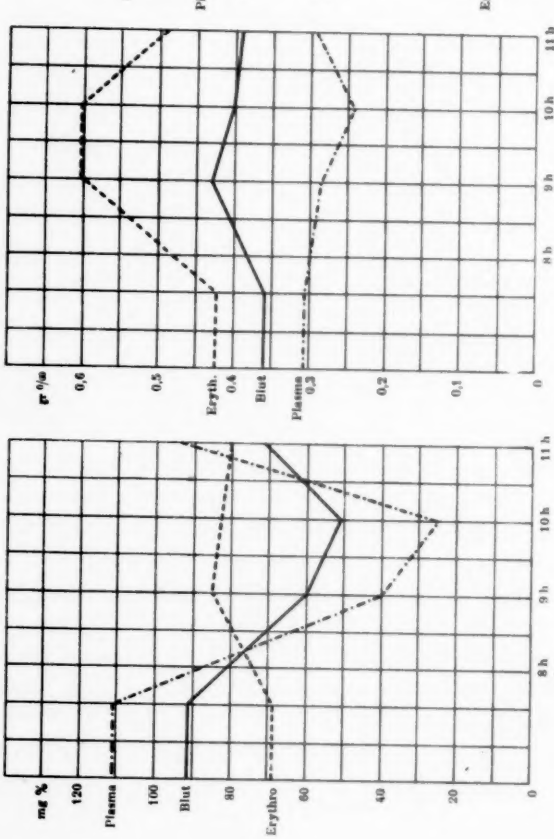


Fig. 1. Blood sugar.

Fig. 2. Urea.

Fig. 3. Chlorides.

increased stomach secretion during the hypoglycemia, while it is well known that in diabetes there is often achlorhydria. Georgi's assumed fall in sugar potential between cells and plasma must somehow be compensated in order to keep the two elements of the blood isotonic. Perhaps the chlorides among other things are used for this compensation and are then excreted in the sweat and saliva. Secretion of sweat and hyperchlorhydria would thus represent a regulatory mechanism of the body. Further researches concerning the dissociation between blood cells and plasma will furnish the explanation there.

The three curves (page 316) were taken from patients who received 50 units of insulin at 8 o'clock and in whom the shock was interrupted shortly before 11.

While the plasma sugar falls from 110 mg.% to 40 and 25 mg.% after 1 and 2 hours respectively, the sugar content of the erythrocytes rises from 68 to 85 and remains at about this height.

The urea content of the erythrocytes rises from 42 to 60 mg.% while that of the plasma falls. We found similar counter movements in opposite directions in the choride curves.

With reference to the technique it should merely be mentioned briefly that the studies were made on the whole blood and on plasma. The volume of red cells was then determined by hematocrit and the corresponding values for the erythrocytes computed.

49. THE USE OF VITAMIN B AND PREPARATIONS OF THE SUPRARENAL CORTEX IN INSULIN SHOCK THERAPY

RUDOLF FREUDENBERG, VIENNA, LONDON

We studied the effect of Vitamin B and of suprarenal cortex preparations on 2 types of complications of the insulin treatment.

1. Cases that reacted to very small doses of insulin with severe hypoglycemic symptoms and showed fever, vomiting and tachycardia after the termination of the treatment.

2. The few cases that were slow to awake after feeding or again became comatose a short time after awakening.

With the first group we believed that one of the factors concerned was inadequate development of the compensating mechanism

to meet the demands imposed by the therapy. This view appeared to us to be supported by the studies of Riddle, Honeywell and Fisher who found that large doses of insulin lead to enlargement of the adrenals. Langecker and Gohar made similar observations. Perhaps the adaptation described by Küppers in cases that were at first very sensitive to insulin is explained by these findings. By the use of preparations of the adrenal cortex we endeavored to reinforce and hasten this adaptation. We gave 2-3 cc. of cortin in the evening until a heightened resistance was attained.

The second group of cases who awake late after they are fed by tube may show either hypoglycemia or hyperglycemia. Most of the time we were able to demonstrate a blood sugar below 30 mg.% three quarters of an hour after feeding glucose. This may be due to delayed absorption or to a reflex discharge of insulin—like the "Staubeffect"—which might nullify the absorption. An intravenous injection of glucose usually helped these cases at once. We gave preliminary treatment with preparations of the adrenal cortex, since according to Last and Verzar the cortical hormone has a definite bearing on the absorption of carbohydrates. Verzar proved that when this process was deranged by monoiodoacetic acid, it could be restored by the cortical hormone. He believed that the absorption of carbohydrate from the intestinal tract and its utilization by the cells depends on its phosphorization. This phosphorization is stimulated by the cortical hormone and by Vitamin B_2, which is said to have the same action.

We were able to observe a case which showed a tachycardia of 162 one hour after the injection of insulin. We interrupted the hypoglycemia at once. The patient was only a little sleepy and could take fluid. 2 hours and 15 minutes afterwards her pulse was 140 and her blood sugar 215 mg.%. In the evening her pulse was 106 and her blood sugar 150 mg.%. In the afternoon we gave her 400 units of betaxin intramuscularly and repeated the dose in the evening. The next morning her blood sugar was still 140 mg.% and her pulse 126. We also saw 3 patients in Vienna who were not awake half an hour after feeding by stomach tube, and were not roused by intravenous glucose but remained comatose with hyperglycemia for several hours more.

In these cases two disturbing factors in the carbohydrate metabolism are demonstrable. There may be a derangement in the utiliza-

tion of carbohydrates by the nerve cells or an insulin-diabetes, so-called, such as was produced experimentally by Wichels and Lauber after continual intravenous injections of insulin and regarded as an effect of adrenalin. There may be in these cases, therefore, a compensatory hypersecretion and prolonged discharge of adrenalin which causes the hyperglycemia and tachycardia. The use of measures calculated to reduce the blood sugar to a normal level seems justified. To facilitate absorption, the cortical hormone seems indicated. Since we did not wish to give insulin again, we tried betaxin which, according to the investigations of Tislowitz with dogs, can cause a fall in blood sugar to 48 mg.%. In his experiments the hypoglycemia produced by insulin was increased by betaxin; this we found to be true also in men and rabbits. There is, however, a tendency of the glycemia to a rapid return to the normal level.

Likewise the use of Vitamin B seems to be indicated in the presence of the complications described. With the second class of cases it is necessary to make a blood test before giving intravenous glucose and to give it only when there is hypoglycemia.

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50. R. FREUDENBERG

We made studies of 50 specimens of the gastric juice: 29 times it was taken from patients who were showing violent myoclonic manifestations. In 22 of these specimens there was an average hyperacidity of 110.6 and an average volume of 129 cc. The highest value obtained was 202 and the lowest 75. In 7 instances the acidity was normal or below normal. 20 times the gastric juice was taken from patients who were showing no myoclonic manifestations. Once an acidity of 87 was found but with a volume of only 15 cc. The average of 20 determinations yielded an acidity of 33.5 and a volume of 60 cc. The lowest acidity in this group was 12, the highest 51.

51. P. RUBENOVITCH [1]

Professor Claude and I are extremely sorry that we have been unable, because of certain circumstances, to prepare a paper on a subject that is particularly interesting to us. However, although we were not on the regular program, you are so kind as to permit me to say a few words. I shall prove my gratitude by my brevity.

I shall make a few remarks suggested by the very interesting papers presented at this meeting.

Müller, in his remarkably conscientious and complete report referred to the conception of schizophrenia peculiar to the school at St. Anne. The differences of opinion between the French school and certain schools of other countries, like Switzerland, which have in the past been of purely theoretical interest suddenly take on a special meaning when it comes to basing our opinion on a therapeutic method like that of Sakel in accordance with the given statistics.

We think it legitimate to restrict the scope of schizophrenia, for we consider it above all a syndrome, showing many different developments. But we do not believe that a person who has entered on one of these developments must necessarily follow it to its end. Schizophrenia, for us, is not a disease but a terminal syndrome, an end stage.

In other words, the Swiss school includes in schizophrenia psychotic states which we consider as spontaneously curable and which are for us cases of mental confusion, attacks of depression or excitation of a dissociative type, or attacks of delirium. Our way of seeing obliges us not to accept without previous examination the account of remissions obtained chiefly in cases of less than 6 months' duration. It does not decrease our confidence in Sakel's method.

Müller declares that the method is not at all dangerous. We make important reservations on that point which we shall try to illustrate as follows: appendectomy passes at present as a safe operation. But no one would think of performing it anywhere without aseptic instruments nor even of entrusting the operation to a physician who was not trained in surgical technique. Appendectomy has become safe because, automatically, it is performed under conditions of

[1] Former Chief of the Clinic of the Faculty of Paris.

asepsis, with a precise technique, and by physicians and a hospital staff who are specially trained.

It is exactly the same with Sakel's method. Before proclaiming its safety let us rather insist on the very real dangers to which it exposes the patients if it is used under conditions where the equipment is insufficient or the staff inadequate. We already know of some cases where, because of a lack of sufficient precautions, the patients greatly suffered.

Müller has indeed wished, in examining the therapeutic factors in the insulin cure, to mention the important part that we attribute to psychotherapy. This factor appears to us to enter often without the knowledge of the physicians themselves—in all the treatments of schizophrenia.

I also ask myself if the contradictory results brought about by the use of certain methods do not proceed from an unconscious change of attitude on the part of the physicians. Such a new method applied with a certain enthusiasm arouses in the physician an active interest and zeal from which the patients greatly benefit. Later, it gradually becomes a routine which the physician follows less closely and from one day to the next the results are no longer the same.

For, is there any other method, which like this one requires the constant presence of the physician and a large staff, not counting that the little drama of the coma with the events preceding and following it is capable of arousing the affective reactions to the highest pitch and sensitizing the patient for the pschotherapeutic action?

The latter is also shown by the very nature of certain psychic reactions of the patient (affective impulses in the course of the anxiety state, an affective transfer to the person of the physician, etc.). Finally, I wonder if the smaller effectiveness of insulin shock in the hebephrenic catatonics does not come, in part at least, from the difficulty the physician has in arousing in them an anxiety state.

The splendid researches of Demole lead him to formulate hypotheses, which seem to confirm our point of view concerning the existence of an element of confusion, to explain certain attitudes, certain reactions of the patient in the course of the phase of "awakening." I allow myself, however, some reservations on his hypothesis concerning the detoxifying rôle of insulin. I think that Claude's idea, of the dynamic disturbances of the cerebral cells, is more

general than this point of view and does not require the introduction of a hypothesis which is so precise and uncontrollable.

We have followed with interest the explanation of the psychological reactions of the patients so minutely observed by Miss Palisa and that of Dr. Humbert where we find many points in common with our thesis.

I should like to repeat that it has been a great satisfaction to see, that on the subject of the same method, studies are carried out on the humoral and neurological modifications and at the same time attention is paid to psychic changes.

Is not this an excellent illustration of our unitarian thesis which tends to look at the morbid condition in its biological unity? It seems that Sakel's method, in permitting the attainment of a sort of somato-psychic arrangement has spanned the gulf which still separates the organicists and the psychogenicists. Its application also puts an enormous value on functional disorders not only in the domain of neurology but also in that of psychology. The experience acquired by the Sakel method confirms absolutely, for example, the fact that a pyramidal lesion revealed by a positive Babinski can only reflect a transitory dynamic injury of the cells of the central system of association.

By analogy, can we not assume the same pathogenesis for certain psychic reactions which are revealed in the course of the treatment? And as these reactions are in every detail identical with certain characteristic morbid states (delirium, excitation, depression, hysteriform manifestations) these too could depend on the same dynamic conditions.

Beside that hypothesis, which might perhaps appear a bit simple, we offer another one: I ask myself if certain psychopathological manifestations of the insulin treatment might not be a reaction, not to foreign non-existing circumstances but to internal disturbances provoked by the humoral and neurological disorders.

All these remarks, the incoherence of which I deplore, show aside from its therapeutic consequences, how much gratitude psychopathological research owes to the Sakel method which is about to create one of the most important chapters in pathological psychology.

In closing I should like to say a word on a secondary matter, namely that of terminology.

What is the meaning of the term "insulin shock"? For Sakel it is the coma or the convulsion. The Swiss authors have agreed, for their part, to say that a patient is in shock when he cannot take a sweetened drink by himself. For us, the state of shock exists from the time when there is a change in the arterial tension, temperature, nervous tone, change in the function of a certain special sense, even if these changes are slight. I believe it is essential for us to agree on the meaning of the term or we shall be in danger of not understanding one another.

As we all know, the word is a literal translation of the English word shock, employed for the first time by the English surgeon, Travers, in 1826, to describe patients who had undergone accidental or surgical trauma. Much later Widal and his school took over the word to designate the state of a patient who had been given an intravenous injection of peptones, for they presented a dramatic picture analogous to that described by Travers.

Later, in studying the hemoclasic shock, Widal and Abrami extended the idea to include patients who did not show these grave clinical symptoms but showed only modifications in regard to hematology, blood pressure, etc. similar to those which one usually observes in shock. And though the term was less suitable because it no longer applied to brutal and sudden phenomena, it was legitimately used for the same manifestations but of less intensity.

I propose that it be so for the insulin shock. Müller will not object to my saying that his definition is too little concerned with physiology and that too many factors might prevent a psychotic person from drinking by himself. We shall say then that there are manifestations of shock from the time when neuro-vegetative symptoms appear, even apart from the hypoglycemic state and that coma and the convulsion are to be considered only as the last phases in the state of shock.

In closing, I wish to thank your president, Flournoy, the organizers of the convention, Drs. Müller and Braun, and all my Swiss colleagues for the kindly welcome which we have received and which I shall always remember. I wish and do hope that in the future many French psychiatrists will come, as I have done this year, to appreciate the interest of your work, the cordiality of your hospitality, and the incomparable beauty of your land.

52. PROTRACTED SHOCK IN THE TREATMENT OF SCHIZOPHRENIA AND RESULTS OF THE THERAPY IN RIGA, LATVIA

W. KRAULIS [1]

Sakel's insulin therapy was introduced in Riga by Dr. H. Saltups after he had studied it in Vienna. 60 cases have been treated, and among them certain accidents occurred which might be of general interest.

1. J. K. Age 27. The patient had been ill with paranoid schizophrenia for 4 months before the treatment. On the sixteenth day of treatment, with 130 units of insulin, the patient was fed by tube for the first time. He resisted violently both then and on the following day, after 135 units, so that on the eighteenth day 140 units were given. Even then there was no deep shock, no sweating, no somatic reactions, no pathological reflexes. When the lids were passively opened, the patient squeezed his eyes shut. He fought hard against the attempt to insert the nasal tube. After a hypoglycemia lasting 5 hours and 15 minutes, 150 grams of sugar were introduced by tube. In 20 minutes the patient awoke, was clear, and talked with the doctor for a quarter of an hour. He then complained of twitching in his right leg. The twitching increased, spread over the whole body and took on the character of an epileptic seizure. Osmon was at once given intravenously, but in 8 minutes another seizure took place. A lumbar puncture was done, and adrenalin and coramin were administered. Within the next 1½ hours there were 7 seizures. In spite of amylene hydrate, lobelin, another lumbar puncture and further use of osmon, the last attack was followed by lethal exitus. Permission for an autopsy was refused.

2. A. K., teacher, age 37. The patient had been peculiar for 6 years, obviously ill for 2½ years. She believed that she was caricaturated in the comic pages, that her relatives were engaged in intrigue, that the food in the shops all over the city was poisoned for her, and that she was involved in an international political plot.

The treatment began December 23, 1936, with 30 units of insulin. From December 27, 1936, to January 16, 1937, it was discontinued because of grippe. On January 16, 1937, it was resumed and on

[1] From the psychiatric clinic of the University and the Institution Sarkankalns. Director: Dr. H. Buduls.

January 23 the shock dose of 100 units was reached. Until January 29 there were no psychic changes. On that day, the seventh day of the shock treatment, the patient received 100 units of insulin at 6:20 a. m. At 8:10 there was a slight twitching about the eyes which ceased at 8:25. At 8:40 there began a twitching of the face, head and right arm, which lasted 15 minutes. At 9:30 there were mild tonic cramps accompanied by acceleration of the pulse and respiration. The tube was introduced. At 10:05 sugar was given by tube. At 10:35 the patient was not yet awake. On her breast appeared red patches (capillary collapse). She received in small portions 300 cc. of osmon intravenously, and coramin. The pulse was small, 130 per minute, but the respiration was good, and the erythema passed away. At 11:10 a lumbar puncture was done, a thermophore applied and an additional 190 cc. of osmon injected into the other arm. At 12 o'clock bright red patches again appeared over the breast and arms. Camphor and adrenalin were given and also 1 liter of physiological salt solution subcutaneously. There was no reaction to pin prick. The blood sugar was 170 mg.%. The heart's action was alarmingly weak. In the afternoon further medication was tried: camphor, strychnin, and adrenalin. After being addressed several times, the patient endeavored to reply. She succeeded in making some sounds and appeared to be in a state of paraphasia. In the evening she spoke more intelligibly. After midnight she began to complain of great pain in her left arm. The arm swelled gradually up to the shoulder and became hard and sensitive to the lightest touch. Hot and cold compresses afforded no relief. The heart's action remained feeble: at times the pulse could hardly be felt. The features were pinched and sunken. On January 30 at 3 a. m. the right arm also became very cyanotic. The legs were warm and their skin normal. At 5 o'clock the radial pulse was no longer palpable in either arm. The patient kept begging that something be done for her intolerable pain. At 9 o'clock the left hand was bluish black as far as the wrist, cold, and insensitive. From its upper third to the wrist the forearm was a grayish violet, greatly swollen and sensitive. The axillary arteries were pulsating on both sides. The patient received padutin and digalen.

On the following day large blisters formed, filled with serous fluid. They were especially marked on the left arm but were also to be seen on the right. She received padutin twice daily for the next

two days. The left hand grew warmer, sensation returned, and the bluish black color disappeared. In the next two weeks the swelling gradually subsided. On the right forearm a necrotic area of skin about 3 cm. in diameter appeared and afterwards slowly healed. The arms were massaged because of muscular atrophy due to inactivity and gradually became stronger. At the time of discharge they had fully recovered. As early as the night of January 29-30 the patient's replies no longer gave evidence of delusions and little by little she gained critical insight into her illness. In a few days her insight was complete. She was discharged as cured.

It is our opinion that we were dealing with an angio-neurotic process induced by insulin and relieved by large doses of osmon. Recently we have not given so much sugar intravenously.

These accidents did not frighten us away from the method. At present we have in Riga 30 beds for insulin patients. We have carried the treatment through to its end in 29 cases; of these three-fourths had been ill for as long as a year. 22 of our patients have resumed their occupations, 6 were not helped by the therapy and one died (the case described above). It is noteworthy that in 7 cases not helped by the insulin treatment after 50-60 shocks cardiazol was employed. In 4 cases of stuporous catatonia the patients were able to be discharged either as full remissions or as improved after 3-6 cardiazol convulsions. These cases will be discussed more fully later.

In all we observed 5 cases of shock protracted against our will. The shock lasted 8-48 hours. We designate as protracted shock instances of complete unconsciousness in which no contact with the patient is possible. 4 of these patients recovered almost in a moment after awakening from coma; one remained unimproved after a coma lasting 43 hours. All of the 4 who recovered had been previously treated with insulin for some time in the customary fashion without showing any improvement at all. 2 of those who recovered after protracted shock had been ill for more than 2 years, 2 for less than 1 year. The one who remained unaffected was a quite demented schizophrenic with a history of a ten-year illness. From these observations we concluded that protracted shock has a great therapeutic value. We tried therefore to make use of it in cases where the usual insulin treatment was ineffectual and cardiazol left us in the lurch.

But patients cannot just be left in shock for more than 1½ hours. A sugar deficiency that lasts too long leads to irreversible changes in the organism, from which there is no longer any way back. Inasmuch as it is only lack of sugar that causes these derangements, we tried giving small quantities of sugar as early as the fourth hour of the hypoglycemia. These doses of sugar are so graded that the patient does not awake, but on the other hand no menacing clinical signs, such as disturbances in respiration, epileptic seizures or spasms of the glottis become evident. Thus we succeeded in keeping the patients 12 or more hours in hypoglycemia and deep coma without the appearance of any complications. They awoke promptly after the oral administration of a moderately large amount of sugar or after the intravenous injection of 100 cc. of osmon.

The present report deals with studies which are still in progress so that we can give no final results nor have we a method completely worked out to describe. We graduated the dose of insulin so that the patient fell into deep coma at the end of the third hour after the injection. At the beginning of the fourth hour the tube was passed through the nose. The patient showed no reaction to this procedure. Then a small amount of sugar, about 10-15 grams, was given. 1-2 hours later sugar was given again, and the small doses were continued up to the time of interruption. There were great individual differences in the reaction. With one patient the dose was too large: he began to wake up; with another it was too small so that respiratory disturbances and other complications set in and the treatment had to be interrupted prematurely. Progress had to be slow and cautious. Any obligatory or uniform procedure would only uselessly compromise the method of protracted shock. The ideal toward which we aim is a quiet deep coma, which is terminated 12 or more hours later by 200 grams of sugar.

Some aid in graduating the dosage can be obtained from changes in the blood sugar level. For greater efficiency we have modified the method of Hagedorn-Jensen so that the blood sugar can be determined in 14 minutes. Further information about this modification will be given in a special paper. The ideal sugar content of the blood during protracted shock is about 40-60 mg.%. When the blood sugar fell suddenly, alarming clinical signs appeared; when it rose, the patients woke up. It is interesting to point out that with the

same blood sugar value the patient may be in deep coma or wide awake, once small or large doses of sugar have been given. If 30 grams of sugar are given 3 hours after insulin, the patient wakes with a blood sugar level of 60 mg.%, but if the same dose of sugar is given within 1 hour after insulin, the blood sugar rises to 60 mg.% but the patient continues to lie in deep coma.

Up to the present time the artificially protracted shock described above has been employed on 6 patients with whom the insulin and cardiazol treatments had been carried out according to the usual directions but without success. After a few protracted shocks 4 of the patients improved so much that they could be sent home, able to work; two were not affected. We believe that these results should encourage further research. Nevertheless we must proceed with great caution since all the dangers of the method are still far from clear. But if artificially protracted shock is as safe as it seems now to be, one might consider treating even acute cases in this way since the period of treatment might thus be shortened considerably.

53. ON SOME BIOCHEMICAL CHANGES IN INSULIN SHOCK

LUIGI TELATIN [1]

On undertaking the insulin shock treatment of several patients I considered it opportune to study at the same time the behavior of certain biochemical substances of the blood under the influence of large doses of insulin. In particular, the subjects of my studies have been glucose, cholesterol, potassium and sodium. I have reported elsewhere on my other researches on the maximum dose of insulin employed and the Weltmann reaction in insulin shock (Congresso della Societa Italiana di Psichiatria, Naples 1937; and Accademia delle Scienze Mediche Naturali e Fisico-Matematiche di Ferrara, May 1937).

Blood Sugar. I studied the course of the blood sugar curve from the moment of the insulin injection, throughout the entire period of coma and to the complete awakening of the patient from the comatose state. From the beginning of the treatment I observed that the blood sugar may fall suddenly to very low levels. Just after the first

[1] Provincial Psychiatric Hospital, Ferrara-Italy.

injection of insulin, for example, I saw that the blood sugar fluctuated in the early hours of hypoglycemia from 30-40 mg.% without coma and with only the symptoms of hypoglycemia: profuse sweating, salivation, pallor, etc. Evidently the organism is still able to react so as to overcome this hypoglycemic crisis and rescue itself from coma without external aid. Indeed the hypoglycemia has only a short duration. As the doses of insulin are increased (in 1 case I reached a maximal dose of 300 units injected at one time) the blood sugar level falls still lower, even as low as 20-30 mg.%, and remains low for longer periods, thus permitting coma to be established up to 3-4 hours after the injection of insulin.

I observed in those patients who went into coma, that, after the first slight fall, the blood sugar tends to rise a little although a marked hypoglycemia still persists. For instance, I have seen the blood sugar rise from 25 to 40 mg.%. I cite a few cases as examples.

Baraldi—fourth day of treatment. The blood sugar before the injection was 92 mg.%. One hour after the injection of 50 units it was 41; two hours after, 48; three hours after, 55. Coma was not produced.

Romanelli—fifteenth coma. The blood sugar before the injection was 96 mg.%; one hour after the injection of 50 units of insulin it was 27 (not yet in coma); three hours after, 41 (complete coma).

The blood sugar during the awakening from coma particularly occupied my attention. It is necessary here to distinguish the arousal induced by intravenous injection of glucose from that induced by the administration of glucose by stomach tube. I shall say only that I prefer to rouse my patients, as far as possible, by giving glucose intravenously in small amounts, 20-30 cc. of a 33% solution. The patient wakes at once but would soon return to coma if his ration of sugar and milk were not given by mouth as soon as he is in condition to take it.

When the awakening is thus brought about by intravenous glucose, the blood sugar mounts rapidly to values above normal. In one case I saw it rise to 595 mg.% one minute after the injection. Usually, however, it rises only slightly above normal and in a few minutes it would return to hypoglycemic values if the opportunity were not taken to give glucose by mouth.

When the awakening is brought about by tube feeding, the blood sugar rises slowly, as would be expected, to reach its maximum in

1-1½ hours. Nevertheless in about 10 minutes after receiving the sugar the patient comes out of hypoglycemia and consequently out of coma. I remember once meeting with a patient who did not awake after tube feeding. Evidently the glucose had not been absorbed. In fact, the blood sugar determinations showed that the hypoglycemia had persisted unchanged.

I cite a few cases.

Romanelli—tenth shock. The blood sugar before the injection was 89 mg.%; one hour after the injection of 50 units of insulin it was 24; two hours after, 27 (patient enters coma); three hours after, 34 (coma persists). After two hours of coma 30 cc. of 33% glucose was injected intravenously. A minute later the blood sugar was 595 mg.%; in five minutes it was 410 mg.%; in ten minutes, 275; in fifteen minutes, 134; in thirty minutes, 100.

Zanforlini—tenth shock. The blood sugar before the injection was 100 mg.%; one hour after the injection of 60 units of insulin it was 33; three hours after, 36 (the patient is in coma). After two hours of coma 30 cc. of 33% glucose was injected intravenously. Ten minutes later the blood sugar was 106 mg.%. The patient did not take the glucose by mouth. In twenty minutes she had lapsed into coma again, and the blood sugar had fallen to 36 mg.%.

Baraldi—fifth shock. The blood sugar before the injection was 100 mg.%; one hour after the injection of 100 units of insulin it was 33 mg.%; two hours after, 33 (patient is in coma); three hours after, 20 mg.%. Then 150 grams of glucose in 500 cc. of milk were given by stomach tube. Fifteen minutes later the blood sugar was 46 mg.%; thirty minutes later, 43; ninety minutes later, 43. As the patient did not awake from coma, I was obliged to have recourse to another administration of glucose, this time intravenously.

Gamberini—third shock. The blood sugar before the injection was 100 mg.%. One hour after the administration of 20 units of insulin, it was 36 mg.%; two hours after, 40 (patient is in coma). After two hours of coma 150 grams of glucose were given in 500 cc. of milk. Ten minutes later the blood sugar was 56 mg.%; in thirty minutes it was 63; in sixty minutes, 143.

Cholesterol. I studied the blood cholesterol during the treatment and especially during the course of each hypoglycemic shock. I noticed that, as the treatment proceeds, the cholesterol value gradu-

ally and progressively diminishes, sometimes to a marked degree. In one patient having the fourth shock I was able to observe a fall in cholesterol from 227 mg.% before the treatment to 134 mg.%, a definite diminution.

In the course of each shock the cholesterol undergoes a diminution which begins to be evident one hour after the injection of insulin and becomes more marked for several hours thereafter. The excursions between the highest and the lowest values vary from individual to individual and even in the same individual from one shock treatment to another. I have often observed that the low cholesterol values found during the hypoglycemia were not accentuated during coma.

I cite a few cases.

Baraldi—seventh injection of insulin. The cholesterol before the injection was 241 mg.%; one hour after the injection it was 125; three hours after, 116 (the patient is in coma). After the patient awoke, and one hour after the administration of glucose, the cholesterol was 133 mg.%.

Zanforlini—third shock. The cholesterol before the injection was 227 mg.%; one hour after, 170; three hours after, 172 (the patient is in coma); twenty minutes after waking, 150.

At other times, however, I noticed no alteration in cholesterol; sometimes it was increased.

Gamberini—fourth shock. The cholesterol before the injection was 200 mgm.%. Two hours after the injection it was 210 (the patient is in coma); one hour after the awakening from coma it was 250.

Potassium. The potassium was studied at the beginning of the treatment and under the same conditions as the other factors already discussed, that is, before the injection of insulin and after the injection at intervals until the advent of coma and its termination. I have not been able to observe marked variations. In general, before starting the treatment, I found values somewhat elevated (29.11-33.37-41.80 mg.%). After the first signs of shock I noticed a tendency toward lower values. There was no real fall, however, after the initial rise.

I shall report some findings.

Zanforlini—fourth day of the treatment, before coma ever had been produced. The potassium before the injection was 41.80

mg.%. One hour after the injection it was 36.10; two hours after, 36.10; three hours after, 38.44.

Romanelli—first day of treatment. The potassium before the injection of 20 units of insulin was 31.45 mg.%. One hour after the injection it was 33.77; two hours after, 31.45; four hours after, 34.79.

With more extensive treatment, however, the elevation of the potassium was more frequent and more marked.

Romanelli—tenth shock. The potassium before the injection was 28.11 mg.%. One hour after the injection it was 29.11; three hours after, 30.53 (during coma).

Zanforlini—tenth shock. The potassium before the injection was 29.11 mgm.%; one hour after, 31.11; three hours after, 33.77 (during coma).

Sodium—The sodium showed slight and rather equivocal reactions. After the insulin injections I sometimes observed no change, less frequently a slight diminution, more frequently a tendency to increase.

Gamberini—fourth shock. The sodium before the injection was 310 mg.%. One hour after the injection it was 322 mg.; three hours after, 368 (during coma).

Zanforlini—tenth shock. The sodium before the injection was 322 mg.%. One hour after the injection it was 335; three hours after, 299 (during coma).

Romanelli—tenth shock. The sodium before the injection of insulin was 356 mg.%. One hour after the injection it was 379; three hours after, 335 mg.% (during coma).

Zanforlini—fifteenth shock. The sodium before the injection was 421 mg.%. One hour after the injection it was 345; three hours after, 333 (during coma). The patient was aroused by intravenous injection of glucose. Ten minutes later the sodium was 345 mg.%, and thirty minutes later, 356 mg.%.

In conclusion, my observations have been that marked variations in the biochemistry of the blood are found in the simple hypoglycemic period preceding coma, that in coma there are in general no striking changes, that sometimes during coma there is a tendency to re-establishment of the biochemical equilibrium which existed before the injection of insulin.

2. Sunday, May 30, 1937

54. HANS W. MAIER (BURGHÖLZLI-ZÜRICH)

Maier welcomes the cautions and critical attitude of all the reports at this meeting toward the results of the new methods of treating schizophrenia and in particular toward the theoretical conclusions to be drawn from these results. He especially emphasizes the warning that in considering the results of the treatment we must never forget the 30-40% spontaneous remissions which are included in the statistics of acute cases, where the treatment is mostly used, and we must discount them. Certainly psychotherapy plays both a direct and indirect part in all these methods of treatment. This is also very impressively pointed out, for instance, in the report of Jenny of Berne and is shown in the statements of other colleagues to the effect that they had better results at the beginning of the use of the insulin treatment than later. In the opinion of its advocate, the prolonged sleep treatment of Klaesi makes greater demands on the psychotherapeutic skill of the physician than either the insulin or the cardiazol methods do. This is the reason that poor results have been obtained by those who did not sufficiently understand this important consideration. We must be very grateful to Klaesi, Sakel and Meduna for the new ways they have shown us for treating schizophrenia which has heretofore responded so poorly to treatment. The experience that we have had with insulin and cardiazol up to the present is far too slight to permit any final judgment. The activities of this meeting will help this study to continue in the most widely separated places with the most uniform methods possible, and this is absolutely necessary. It must make us feel rather thoughtful to realize that the same goal is being reached by such different ways. This seems to indicate that we are dealing not so much with a specific way of treating the schizophrenic process as of assisting the tendency to remission. This is not to decry the value of the new methods but to make us cautious with respect to our theoretical conclusions as well as our practical results. At any rate it would be premature and fatal to arouse unwarranted hope in the laity and especially in the relatives of the patient. Such hope has unfortunately been raised in publications of a non-medical source and may lead to great disillusionment and to an increased mistrust of the

medical treatment. Therefore we should all be careful to restrict the discussion of these weighty matters to just ourselves until they are entirely settled.

55. J. KLAESI (WALDAU-BERNE)

The insulin treatment of schizophrenia and also the convulsion therapy with cardiazol mark a very great gain and an enrichment in our therapeutic tools, and we cannot be too grateful to their discoverers. If we have not yet made use of the insulin treatment in our psychiatric clinic in Berne it is only because we were succeeding with our present methods in the acute cases for which insulin is chiefly used. We have, however, sent an assistant to be trained in the insulin therapy and we shall make use of the treatment when we have cases that are not successfully treated otherwise.

The advance which the insulin therapy represents for psychiatric practice would naturally not be less if the method required still more outlay and trouble than it does, for our duty is to help, and our success depends to a very essential and decisive degree on how much the patients feel that we are sacrificing and devoting ourselves to them. The method would not lose in value if it were more dangerous than it is described, provided it be used, as prolonged narcosis has been employed up to the present, in hopeless acute and in severe chronic cases, for even the surgeons perform operations where life and death are in the balance, and I should like to know who would question a last attempt to secure a remission of a prolonged illness, even if this last resort did entail danger.

We, as Swiss psychiatrists, are particularly grateful to Dr. Müller to whose credit it is that the insulin therapy has been spread so quickly and so intelligently in our country and has been employed with the fewest possible accidents. From the beginning he has insisted that the method must be carefully learned and must be carried out meticulously according to the rules. The unfortunate experiences which have been reported from a too independent use of prolonged narcosis may thus not have been in vain.

If, in spite of all our gratitude and recognition, critical remarks are still in place, I offer two: first, the statistics from the institutions in which all acute cases are treated with insulin give a false picture of the therapeutic value of the method. I realize very well, that if

one wishes to decide which pictures of conditions are more in favor of the treatment and which less, one would first treat all cases; but if one wants to compare the results secured with those attained by other therapeutic measures, one must take into account the fact that 60 social cures and far-reaching improvements out of 100 cases of acute schizophrenia is frequent even without insulin, at least in institutions where one pays sufficient attention to the patients.

Comparisons are permissible only when the studies are made on homogeneous material. The most inaccessible, most hopeless cases, and often chronic cases, are the ones treated with prolonged sleep. In the second place, we must remember that here and there we find a natural readiness to subscribe unreservedly to any new method of treatment and enthusiastically to exchange all the previous therapeutic measures for injections. Poor victims of mental illness! How little we have known this long while how to begin their treatment, and how poorly the truth has been and still is recognized in many quarters, namely, that as I shall never weary of reiterating, an absolute devotion to any one school or method is the mark of ignorance or of mediocrity.

A good drill sergeant is letter perfect in the service rules and tactical regulations and follows them, come what will. The good general naturally knows them too, but he does not use them in every case. Instead, he takes them as a basis for maneuvers which differ from situation to situation. It is not otherwise with the psychotherapist.

56. MÜLLER (MÜNSINGEN)

Jenny's paper on the prolonged-sleep treatment of schizophrenia may have given the false impression that I am fundamentally an opponent of Klaesi's method. Everyone who has followed my publications on this subject knows how unfounded such an assumption is. On the contrary, I should like to emphasize here once more that I myself have repeatedly used prolonged narcosis for 15 years and have always, even in my book on the "Prognosis and Therapy in Mental Illnesses" which appeared early in 1936, given this method first place among the medicines used in methods of treatment of schizophrenia. My criticism referred merely to the use of somnifen. If, as I believe, somnifen is not the ideal drug for inducing pro-

longed narcosis and if better results may be obtained by the use of other hypnotics, still this is a secondary question and does not in the least minimize the significance and value of Klaesi's discovery.

Surely, all those, here present, who use Sakel's insulin therapy realize what a serious problem spontaneous remissions in acute schizophrenia furnish in evaluating the results of the therapy. When Klaesi rightly claims that comparisons with untreated cases or with cases treated by other methods can be made only under similar conditions, we may point out the researches of Ederle at the Tübingen clinic and of Dussik in Vienna. Both authors compare their results obtained with the insulin therapy with similar cases that had not been treated with special therapeutic procedures or were treated by other methods in former years. These studies may also answer the criticism of the French school (Claude and Rubenovitch) if in our cases treated by insulin are included numerous cases which are considered by the French investigators as curable psychoses of non-schizophrenic nature (mental confusion, attacks of delirium, etc.). This also may apply to the French material, as compared to ours. The almost doubled percentage of improvements and remissions with the insulin treatment speaks unconditionally in favor of the method regardless of diagnostic differences. The fact that in the statistics of insulin remissions are included a number of cases which would have recovered spontaneously or if treated by other methods should not in practice lead one to use the insulin method only when the prognosis is unfavorable and resistant to all other treatments. So long as our prognostic criteria are as imperfect as they are at present, surely it is better, from the therapeutic point of view, to subject all the acute cases of schizophrenia, if possible, to the treatment at the optimal moment. The possibility of still being able to save patients who would otherwise be lost, even though they be few, outweighs the disadvantage of including in the number of treated cases some who would have recovered otherwise.

57. V. DEMOLE (BASEL)

It is possible that substances of diverse origin, by stimulating metabolism, may exercise a favorable influence on the therapeutic action of insulin in the treatment of dementia praecox. In the first place, one may mention here the hormones (thyroxin, di-iodotyro-

sine, the hormone of the anterior lobe of the hypophysis, adrenalin) and the Protamine-Zic-Insulin, certain derivatives of guanadine (Synthaline), the vitamins (especially B_1, B_2) and various analeptics.

58. WILMANNS (WIESBADEN)

Although the numerous theories which have been brought forward at this meeting concerning the mechanism of insulin shock were of great interest, they were so manifold that the problem has remained unsolved. The reasons why schizophrenia appears and the processes by which it is cured are a riddle that defies solution to this day. The psychiatrists of today like those of 100 years ago are split into two camps which base their theories on altogether different foundations, the psychic and the somatic. The members of the psychic school believe that they can cure schizophrenia by psychoanalysis and psychotherapy. I do not believe this. I count myself as an adherent of the somatic school.

As early as 1896 Kraepelin explained dementia praecox as a metabolic derangement and fed his patients endocrine glands, thyroid and the like, always without success. After the World War we found in encephalitis lethargica a great number of endocrine and psychic disturbances—obsessions, compulsions, etc. which resembled very closely the abnormalities seen in schizophrenia. At that time therefore, I considered it justified to assume that the cause of this malady is to be found in the basal ganglia, especially in the midbrain. For the midbrain controls the autonomic nervous system and thereby influences the function of the endrocrine glands. Midbrain, autonomic nervous system and endocrine glands form a harmonious unit; if one of the three parts fails to function the orchestra is out of tune. Histological investigations could lend little support to my theory.

Nevertheless it is an undoubted fact that in the brains of schizophrenic patients organic changes do take place. They were demonstrated by Nissl years ago. But they cannot yet be, to use Nissl's expression, "reduced to a common denominator."

One of the most puzzling brain changes in schizophrenia is cerebral edema. Histological alterations are not striking in spite of easily perceptible gross changes in this condition. The cause of the

edema is a very great influx of water into the brain tissues. We recognize this feature clinically only in the case of sudden death of patients with catatonic schizophrenia. Nevertheless I have a feeling that the frequency of this serious pathological alteration is greatly underestimated. Thus there are the changes in the cerebrospinal fluid and its pressure so often noted in schizophrenia and above all the severe, long-drawn-out headaches most marked at the beginning of the disease, which were described by Haymann many years ago. Headache, dizziness, fainting, and epileptiform seizures indistinguishable from genuine epilepsy, are much commoner than is generally supposed, especially at the beginning of the disease. I believe that these phenomena are expressions of cerebral edema.

If this view is correct, it offers an explanation for the mechanism of insulin shock. Meduna stated in his paper that after spontaneous epileptic seizures remissions of schizophrenia had often been observed. I can confirm that statement. We have seen in the clinic several schizophrenic patients who showed an improvement in their condition lasting for weeks after an epileptic attack. I consider it possible that the organic processes which take place in the brain during an epileptic seizure produce an alteration in the water balance of the brain and thus decrease the edema.

If this assumption is correct, we may perhaps place the effects on schizophrenia produced by Klaesi's prolonged narcosis and that of Serjeski and Feldmann, by Sakel's insulin shock, and by the epileptic attacks in Meduna's cardiazol therapy alike on the single basis of a change in the water economy of the brain, which was brought about by a certain paralysis of cerebral activity by sleep, coma, or epileptic seizures. This interpretation is also only a theory. In the darkness which hovers over the etiology and the medicinal treatment of schizophrenia, let us hope that this theory of mine will soon be set aside by a more convincing one.

59. J. P. FROSTIG (OTWOCK)

From the researches of Zolliker it appears that insulin is not to be classed as a drug which produces epileptic seizures, in contrast to alcohol, adrenalin and cardiazol. H. Winiarz recently reported similar studies with cardiazol to the psychiatric society in Warsaw. He was able to establish that the sensitivity threshold for cardiazol

is much lower in patients with epilepsy than in those with schizophrenia. Obviously then insulin does not attack the same convulsive mechanism as cardiazol or any other stimulus that causes an epileptic seizure in epilepsy. In my Polish work [1] and in the Richtlinien [2] I emphasized that most convulsions which we meet in the insulin treatment of schizophrenia show special symptoms. This is particularly true of those seizures which usually occur in the second and third hours after insulin. We have been able to demonstrate symptoms in convulsive attacks due to insulin:

1. Hyperkineses dominate the shock picture. They usually present a myoclonic coloring. The subcortical phase is often protracted.
2. The attack either comes suddenly, without aura, or there are preliminary myoclonic twitchings.
3. There is at first severe heart and vascular collapse. The complexion becomes gray; the mucous membranes are livid; the heart sounds are barely audible, and the pulse is weak and rapid.
4. Simultaneously, or a little later, there are massive rhythmic twitchings of the head and limbs. They differ from the clonic ones in being sudden, from the myoclonic in the relatively great radius of articular movements.
5. There is no phase of tonic convulsion. The head is bent forward and completes the movements without changing this position.
6. The pupillary reflexes are lost. We did not observe any passage of feces or urine. The tongue is frequently bitten. It is noteworthy that the muscles of mastication and the tongue musculature take part in the movements. Since the convulsion is essentially different from an epileptic seizure, we have designated it as "Myocloniform Vascular Collapse."

We were able in every case to interrupt an attack with 10 cc. of 25% glucose, given intravenously. We also frequently succeeded in having the attack pass without interference. We must at any

[1] J. Frostig, J. Kister, A. Manasson, Wl. Matecki Rocz. Psychjat. XXVIII. 1936.

[2] J. Frostig—Vorläufige Richtlinien für die Insulintherapie der Schizophrenien. Verlag Ars Medici, Vienna.

rate emphasize that the only case we lost through the insulin treatment died in a myocloniform vascular collapse.

We have been able to demonstrate that in many patients these seizures tend to be multiple.

So far we have been able to formulate no opinion concerning the systematic brain localization of these attacks. The idea rather intrigues us that we may here have to do with a peculiar sensitivity of the subcortical area of the brain.

60. THUMM (ILLENAU)

Thumm mentions, among many encouraging experiences, some accidents with the cardiazol convulsion therapy which did not involve the circulation but the respiration. Diseases of the respiratory tract—in particular those diseases of a rather chronic, stationary character with changed respiratory surface—are contraindications to the treatment. In general it is recommended that we pay close attention to the state of the respiration and especially to the alarming interruptions of respiration which are frequently observed in connection with the cardiazol paroxysms in persons of essentially healthy physical condition, and if necessary to treat them with lobelin and artificial respiration.

61. PALISA (VIENNA)

I should like to add a short casuistic note to Zolliker's detailed account. The case is that of a schizophrenic patient who has been subject from childhood to epileptic seizures which finally occurred at intervals of 2 to 3 months. Always there was just one seizure. The patient had had no medication. He was given the insulin treatment, and it was observed that he gradually went into deep coma and never reacted with an epileptic seizure. He had no seizures during the course of the insulin therapy and was given no other form of medication. Right after discharge he had an attack and then had no more for 3 months. After that he suffered 3 very atypical seizures in one day, and 3 days later there was a recurrence of the schizophrenia symptoms. For obvious reasons the insulin treatment was not repeated. Since this is only an isolated case, I should not care to draw any conclusions.

62. SAKEL (NEW YORK AND VIENNA)

On the Reports of Maier, Klaesi and Wilmanns

In today's meeting several prominent psychiatrists have spoken about the somatic and psychotherapeutic means of attacking psychoses. Even if the hypoglycemic treatment is undoubtedly to be evaluated on a purely somatic basis, yet one cannot help concluding from the observations made on a large number of the cases treated that psychic factors also play no insignificant part in the therapy. It is perhaps the great advantage of the hypoglycemic therapy over other methods of treatment that in it both the elements of the psychiatric-therapeutic methods can be utilized. Even in my first studies in the treatment of morphine addicts with insulin I saw that the insulin therapy in serving as a "damper" of the antagonistic hormones lessened the autonomic stimulation and thereby made possible an earlier contact between the patient and the physician. I think I may assume that in the schizophrenic patient the autism is overcome biochemically by means of the hypoglycemia. But this does not deny that the contact thus achieved merely opens the way for psychiatric treatment. I believe that to this factor is to be ascribed a very significant contributing effect. On this point the insulin treatment and Klaesi's method are in agreement. In my opinion this conception is not at variance with the hypothesis which Professor Wilmanns so graphically outlined here. The conjecture that the hypoglycemic treatment attacks the autonomic centers and from there, evidently by way of changes in the water balance, leads to its therapeutic effect, opens up new paths in the evaluation of the pathophysiology of the treatment. With reference to the association of the psychic and the autonomic effects, I should like to refer to the works of Hoff and Heyer among others. Certainly I believe that the mode of action of insulin is not a simple one and that the favorable influence is to be looked upon as the combined result of various factors.

In my earlier work I emphasized that the therapeutic effectiveness of the moist shock with a water loss of 2 to 3 liters was in nowise less than that of the dry shock, or epileptic attack without a water loss, and was possibly even superior. Even so, I believe I can show that in certain cases the moist shock is the more effective and in others the epileptic seizure is more effective. Producing the one

or the other type of shock at will was very early set as a desirable goal. I formerly regarded as unfavorable the intermediate type between these two forms of shock,—a coma in which there is neither sweating nor an epileptic seizure. In the treatment of the individual schizophrenic states there are certain differences, both in respect to inducing the moist shock or the dry one and as regards the time of its termination. Thus it is more favorable to interrupt the shock at the time of excitation in stuporous cases, at the time of stupor in the excited catatonic, and during the deep coma in the paranoid condition. These modifications of the method suggested by me in my last work apply only to acute cases. Of course, there are exceptions here, as with all rules. In chronic cases a deep amnesia is nearly always needed. I believe that a protracted shock is especially beneficial in such cases.

To achieve a profound retrograde amnesia for the sake of influencing firmly fixed delusions the following modification seems to me to be promising. The patient, who will have received the full shock dose, is given a portion of the needed sugar after 4 to 5 hours of hypoglycemia. This sugar is soon taken up by the sugar-deficient cells and it keeps them alive. The amount of sugar should not be enough to raise the blood sugar level. With several repetitions of this procedure one can manage to keep the patient in coma for several hours. I am delighted that Dr. Kraulis has independently come to the same conclusion and is able to report favorably his results. Of course, I think that this modification requires further clinical testing. Professor Wilmanns has mentioned the disturbed water balance of catatonic patients. I have tried with similar reasoning to increase the effect of the hypoglycemia both by means of toxic quantities of water and by dehydration. I think that dehydration gave the better results. I try to bring about dehydration by giving the patient 0.5 gram of quinine daily for a fortnight. In that way I was able to show in many cases, mostly of the excited catatonic type, in whom previously only a dry coma had been induced and who were not accustomed to having an epileptic seizure, that by means of the quinine the shock type was changed either to one that was distinctly moist or to a definitely dry shock with an epileptic seizure.

3. Monday, May 31, 1937

63. VON BRAUNMÜHL (EGLFING-HAAR)

Before I come to speak of particular questions, permit me to express before this assembly my gratitude to the man who has secured the acceptance of the schizophrenia treatment in such a far-sighted way in one of the largest institutions in Germany. That man is my chief, Dr. F. Ast.

Let me first point out rather sketchily some problems in psychopathology.

1. More attention will be paid to disturbances of consciousness in our schizophrenia patients than before, since our experience with insulin-treated patients has shown us again and again that these disturbances are more common and more marked than is generally thought.

2. Very interesting and hard to interpret and analyze are certain phenomena which one might quite reservedly classify as "Modulation of the nucleus of the personality." We hear from schizophrenic patients, who have been treated with insulin and have had a full remission, and even more often from their relatives that there has been a thorough transformation. We are told, "I am freer, gayer, happier, franker,—an altogether new man." It must be expressly said that these manifestations are not to be explained by the hypomanic mood of the successfully treated patients! Students of neuroses will have to take up these problems in particular.

3. The problem of the so-called late ripening has more practical importance. Over and over we see cases showing slight affective improvements weeks and even months after the completion of a course of treatment which appeared quite unsatisfactory at first. It is very important that these patients be brought back to the hospital and treated again. In this way we realize to our joy that we have succeeded here too. It is not clear how we can explain satisfactorily this late ripening.

The subject just outlined brings us to the general problem of the mechanism of the action of insulin therapy. At this point I should like to call attention to the interesting and carefully formulated views of Wilmanns. In speaking of cerebral edema, as Wilmanns did, one need not think of such grave pathological changes as we often

see on the autopsy table. But that mild forms of this peculiar alteration of the brain substance play a great part in schizophrenia is also my conviction. It is important that we keep always before us the fact that swelling of the brain and cerebral edema are not one and the same thing. The subject of swelling concerns the water metabolism of the brain most intimately. It is regrettable that we know so little about it as well as about water metabolism in mental diseases and especially in schizophrenia. It is necessary to get as good an orientation as possible on the subject of water metabolism since insulin exerts its influence along this line. I should like to warn against leaving endocrine phenomena out of consideration today. I need not tell you to what extent the water balance depends on endocrine influences.

As regards the action of cardiazol we need only remember that to cardiazol, as an analeptic, belongs the property of provoking convulsions. The essential element seems to be vascular, whether we attribute more importance to the angiospasm, to vaso-dilatation, or to stasis. The undoubted vascular effect of cardiazol does not excuse our overlooking the far more complex processes that may take part in this method of treatment. I shall illustrate by a simile. If you throw a stone into the water you hear the splash and you see something on the surface of the water. But after the stone strikes the water and becomes invisible as well as inaudible to the spectator, it still obeys mechanical laws. How wrong the observer would be to hold that everything is explained by the splash and the spreading ripples. Thus, with the action of cardiazol, after the convulsion all the processes outside the vessel wall are altogether unknown, but should not therefore be left out of consideration. The convulsion by itself is not the most important part of the process, although it may be the *primum movens*. The mode of action of the cardiazol therapy may be analyzed quite arbitrarily by analogy with genuine severe migraine. In the pathogenesis of migraine too the vasomotor spasm is a very important factor, but it is only one factor. The angiospasm in migraine may have some such effect as this: you often hear people with severe migraine say that after a miserable day, that is after the spasm in the brain has passed away, they feel unusually energetic and cheerful. This is natural. In migraine too, vessel spasm is not the whole story, but endocrine disturbances and especially disturbances of the water balance are also significant.

We must bear in mind in considering the cardiazol convulsion that not only the cerebral cortex but also the basal portions of the brain are attacked. It should be emphasized that these explanations of the mechanism of the action of the cardiazol therapy rest on the working hypothesis that the convulsions strike the vascular system directly or at least have their effect through the vascular system. I am inclined to make similar assumptions with regard to the so-called genuine epilepsy.

The epileptic seizures that accompany insulin therapy are the subject to many interpretations. Only the most painstaking analysis can throw any light on this subject. The division of seizures into early and late ones may be opposed by a classification based on pathogenesis. At one end are the attacks that definitely start from the vasomotor apparatus. At the other end are the "parenchymal seizures." Permit me to enlarge somewhat on this point. We see patients again and again who respond with an attack almost every time in spite of the most careful administration of the insulin. This trait was most conspicuous in a boy of 13 whose case teaches us that there are probably adults who preserve this epileptic tendency, an infantile type of cerebral reaction. "Parenchymal seizures" can be brought into relation with the metabolism of calcium, and I believe we could induce epileptic attacks in insulin hypoglycemia by altering the diffusion of calcium from the tissues. We might also intervene on the vasomotor side. I am planning to carry out on insulin patients Muck's experiment, the stimulation of the radial artery at the wrist with ethyl chloride spray. Muck, as is well known, has announced that attacks can be induced by this method in epileptic subjects although his findings could not be confirmed elsewhere. So much for the attacks.

As a practicing physician I can make you a few suggestions. My remarks about calcium metabolism have a practical bearing. In patients who refuse to come out of shock, try calcium-Sandoz intravenously along with the glucose. When patients do not go into shock at all or do so inadequately, when they fail to sweat, in short whenever you are dissatisfied with the picture, try the Zig-Zag method which I have described in an article in the Psychiatrisch-Neurologische Wochenschrift (1937 Vol. 15). Reduce the ineffective shock dose from day to day to the original dose used in the beginning of the treatment. Then give the whole shock dose or

half of it the following day. In that way swing the patient back and forth one or more times until the reaction is satisfactory.

Any of you may have the misfortune to lose a patient and be brought to trial for criminal negligence. If you are to appear before the State's Attorney, petition that a court physician be summoned for the hearing. It is a difficult task to explain to a lawyer things as complicated as all the matters connected with the insulin treatment. Moreover, nobody can say definitely today at what point criminal negligence begins in a case of death from insulin shock.

If you ask me as an anatomist what is seen in the brain of a patient who dies in insulin shock, I must take refuge behind the poverty of the findings. The chief reason is that the interval between the shock and death is relatively short. What we have been seeing are changes in the brain that are regularly to be found in circulatory disturbances: pallor of Ammon's horn with ischemic cell changes, glial proliferation in the dentate nucleus and olive. Of these changes we cannot say today to what extent they are exclusively circulatory; or whether they may refer to certain toxic influences. The picture in the kidney at times points to a toxic component.

In conclusion may I make a remark about the anatomy of schizophrenia. If it were possible today for you to ask the old master of German histopathology, Franz Nissl, for his opinion, he would probably tell you that the outlook for an anatomy of schizophrenia has become very much worse than it was in his day. Nissl, who examined the brain sections through the night hours and attended his patients in the daytime, would, I think, say to his younger colleagues, "Let us lock up the microscope for a while and take in hand the syringe with insulin and cardiazol to enjoy the blessings of this humane medicine, this work of helping and healing which, to its present extent, was long denied to psychiatry!"

64. LADISLAUS V. MEDUNA (ANGYALFÖLD)

Discussion of Dr. Thumm's Paper

I do not consider it alarming that Dr. Thumm observed disturbances of the respiratory center in his 3 cases, since the condition was easily controlled. I think the reason was that Dr. Thumm used

a 20% solution instead of the 10%, which I employ. I most definitely advise against the 20% solution since I know of one case where the use of that concentration caused auricular fibrillation. This passed, it is true, but such an event does not occur with the use of the 10% solution. It seems to me quite likely that a 20-year old tuberculosis might flare up again because of the convulsion treatment. For my part, I see no great danger in that, for if the schizophrenia is cured, the patient's manner and condition of living are so much changed for the better that he can take up the battle against the fresh attack of tuberculosis with some hope of success. The case is certainly a warning and confirms my point which I have always emphasized: patients must have a thorough physical examination before the beginning of the treatment.

65. F. GEORGI (WALDAU-BERNE, YVERDON)

At the request of many colleagues I shall take up in greater detail the technique of the administration of cardiazol in the first or second hour after insulin and the summation procedure. For complete details see the forthcoming work of Georgi and Strauss. Once more it is proved that humane as well as theoretical considerations make this procedure the best one in certain cases. It is recommended first in all those cases showing only incomplete remission or none at all after 3 months of Sakel's insulin therapy. Furthermore it is indicated in stupors which show no activation after several weeks of treatment with insulin. The summation procedure is used twice a week. If the convulsions affect the physical condition of the patient too severely, insulin is omitted on the intervening days. Mr. Sakel too holds that the method as described by us is proper in the situations just mentioned. Only in the domain of theory a difference of opinion may exist. I represent the point of view that in the summation procedure certain parts of the pathophysiological processes operative in the insulin treatment are strengthened. Hence the term summation is used. We are dealing with an intensification of a part of the pathophysiological processes which take place in and about the cell during the first 1-2 hours after the administration of insulin. Our experimental studies seem to me harmoniously to support the fact that the potential described in my paper comes into play as a result of insulinization to a greater or

less degree according to individual differences. This potential which leads to the opening of the floodgates is unquestionably intensified by the cardiazol convulsion. Therefore in individuals in whom insulin alone is insufficient to provide this partial effect to the proper degree of intensity, we come to its aid with cardiazol. I used the expression partial effect intentionally because in many cases considerable importance might be attributed to those other changes dependent on insulinization that take place after the "turning point." And I find that in a series of papers and reports (cf. those of Beiglböck, Freudenberg, Gross, Humbert and Friedemann [New Proposal for a More Humane Form of Pure Cardiazol Therapy], Küppers, Pfister and others) observations are reported which are in complete agreement with our experimental findings and our theoretical and clinical considerations. In fact this correspondence has been mentioned by some of the authors themselves.

Moreover, Professor Demole's explanations, in our opinion, do not all contradict our findings. Demole sees an important factor in the activity of intracellular enzymes and mentions especially cell respiration, while he regards our findings and those of others as of secondary nature. It is self-evident that all those changes described by Mr. Demole take place in the cell, and on the basis of experiments of Hörber and Bethe and others are to be explained as results of processes that go on at the cell membrane. In my description of these processes I mentioned especially their influence upon the changed metabolic condition. Alterations within the cell membrane are as important for the therapeutic mechanism as events outside the cell. The relation between the protoplasm and the external environment requires no special mention. Furthermore I share completely the view of Professor Demole that probably even more can be accomplished by giving hormones along with insulin. In amenorrheic patients we have combined Kaufmann's treatment with the insulin treatment. Our experience is still too limited to permit us to make any final statement about the possibility of accomplishing more in this way.

Finally, let us consider problems of detail. The pupillary phenomenon described by Mr. Wespi interested us the more because it presents in many aspects a slow motion picture of the pupillary behavior observed by us after cardiazol convulsions. We have not yet been able to confirm by our own investigations the results of

Dr. Forstmayer concerning the barrier. We did show that it is in general more permeable in the course of the treatment. Also, we could not assent to the report on the behavior of cholesterol because no regularity in the variations was observed. That patients fail to awake in spite of high blood sugar, as Dr. Müller has pointed out in his paper, depends, in our opinion, on a loss of the power on the part of the cells to take up the sugar offered them. We agree fully with Mr. Müller that in these cases further administration of sugar is to say the least altogether useless and that we must seek in some other way to restore to the cells their power of storing sugar.

66. STORCH ALFRED (MÜNSINGEN)

It is natural that, at this meeting where a new somatic therapy is being discussed, biological problems of medicine should be prominent because of their greater urgency and actuality. But it seems to me necessary, for the continuance of the work, that the real psychopathological and psychiatric issues keep their rightful place. In his address here and in his earlier papers Mr. Müller has touched on this question to some extent. On the one hand, one is concerned with the auxiliary significance of psychotherapy—to my mind a problem to which too little attention is paid—and on the other, one should bear in mind the psychic processes not only in the specific experiences under insulin but also the psychic phenomena of the healing process. I shall speak only of the latter. I shall raise some questions that seem to me especially important. Is there a specific mode of healing in the sense of a special insulin cure? Is the psychic experience in spontaneous full remissions, under similar circumstances the same or something quite different? Back of these questions is the chief problem as to what a real mental cure means. To avoid confusion we must supplement our observation of the course of the recovery under the effects of insulin by the testimony of selected patients. Then we learn something like the following, so far as we can gather from a few individual cases:

1. Perhaps the most essential change is in the affective condition. The mood has the character of the healthy, the released, the freed, "the feeling of freedom is something precious," said one patient.

2. The psychic and the physical signs of the disease are no longer noticed by the patient and lose their oppressive character. For this disappearance and submergence many patients use the word "forgetting." "Is the insulin treatment a forgetting treatment?" asked one patient. They do not use "forget" in the sense of "no longer know." The patient just mentioned described the inner experience by saying that in the feeling of release there is no room for that of the illness and so it gets pushed far into the background.

3. The retreat of the hallucinatory experiences seems to be accomplished in close connection with the reestablishment of a new social contact. The phenomena of the transition at this period need to be studied more searchingly. A patient said of his "voices," "I have a sort of reminiscence of them," "It is as if the nurse said this or that over me." It is "a sort of pretended hearing." The voices lose their character of sensory reality; they are reduced to having an emotional significance and no longer have the character of direct sensory experience for the patient; therefore, they no longer can lay claim as "perceptions" to be taken as real, that is, to have a meaning in the world in general as actually existing. The study of this transition process may afford us true explanations of the nature of hallucinations.

4. The question of how the breaking-off of the sense of the reality of delusions takes place needs special study. It seems that the delusions lose significance and importance for the patient with the reappearance of a more lively social intercourse at the same time the claim of delusions to reality in the sense of their being realized by the patients in our common world fades away. One patient who is at present under treatment at our institution has an ever more extensive systematization of his delusions which began insidiously while he was completely sane. He is waiting for a girl to come back to him although in reality she will no longer have anything to do with him. He hopes in company with her to found a sort of new world-order. In the last few days, in the course of the treatment—he has wavered a little in his belief. He expected the great change to come at Whitsuntide but it has not happened yet. It is striking how he adjusted himself to this unfulfilled expectation. He says "it might be that everything is different. I shall cling to my faith until I am convinced of something else." If one takes into consideration the structure of this man's personality and the

history of lack of fulfillment and knows what psychic significance the realization of the delusion might have had for him, then an expression like the following is all the more striking: "It is possible for me to build myself an existence even if my ideas are false."

5. The attitude which the patient gains in regard to himself and to his life history is to be seen in his feeling free from the oppression and imprisonment by the overwhelming phenomena of his illness and feeling once again that the possibilities of the future are open to him. "I can look at the future again" said one patient. These patients feel that they have overcome their life difficulties by which they were completely dominated during their illness—they have grown up in this respect much more than before the psychosis. One patient, who suffered greatly from her dependence on her mother who had wished to force her into a certain marriage of convenience, said after the treatment that she would no longer let herself be ruled by her mother but would have "more voluntary regard for her." "The motto of my illness was the turning from mother to husband." "Now that no longer troubles me." In another young patient the delusions of the psychosis were based on deciding between her father and her friend who differed greatly in their outlook on life. After the course of the illness she realized that she had been "too idealistically" reared and had been unwilling to realize that there are irreconcilable contrasts among people. Now she can endure this: "I even find it beautiful to have the light and shadow side by side." "The illness was a real life-experience, but in the positive sense." The solution of the life-problem often follows in the sense of a renunciation of certain life-long desires. The resignation gained is in contrast to the inability to make such a renunciation before the psychosis. Whether the life problem, which often is not evident in its deep significance before the psychosis, is really solved and in what sense cannot easily be stated in detail. Therefore the fundamental question concerns the nature of the recovery, whether it signifies a mere return to the usual activities of every day life or it is a state of freedom for the hitherto unrecognized possibilities of the personality.

67. ADOLF FRIEDEMANN (BELLELAY)

Epidural and Endolumbar Use of Vitamin B_1

In three patients we were unable to have any success with the customary use of Vitamin B_1. Two were serious cases of real Korsakow alcoholism with a complete paralysis which had lasted in the one case (G.) more than three years and in the other (B.) more than one year. Both presented all the signs of a serious organic dementia with confabulation. In addition B. was incontinent of feces and urine, utterly incapable of any voluntary movement. He had been treated for more than a month in a Western Swiss University Clinic with a daily injection of vitamin B_1, in the usual way. These patients were committed to us as incurable from two different clinics of excellent reputation. The third patient had cerebrospinal lues and after the treatment with salvarsan showed the picture of Landry's paralysis with a complete paralysis of the arms and legs and finally of the abdominal and dorsal musculature.

We shall limit ourselves to saying that after an average of four months' treatment all three patients were enabled to work and walk again. Even the severe organic dementia was so much improved that the patients had complete possession of mental faculties and were oriented both for time and place.

We administered 500 international units of vitamin B_1, at first once a week epidurally, with the usual precautions. When we saw after adequate trial that endolumbar administration was not irritant, we changed to it. We gradually increased the intervals until at the end the endolumbar injections were being given every three weeks. Since the firms of Hofmann-La Roche, I.-G. Farben and Merck generously supplied the material, we were able to demonstrate that benerva as well as betaxin and pure aneurin (betabion) gave equally good results. Side-effects were observed only twice during the entire period of endolumbar injections. These were a tendency to vomit, which appeared on the day after the injection, and a slight discomfort and headache that lasted four days. It was not necessary to treat them with any drugs.

We believe that we can conscientiously recommend our modification in the use of aneurin.

68. SAKEL (NEW YORK AND VIENNA)

In connection with the paper of Dr. Marzynski of Wilna I should like to mention that the modifications of the original method published in my last work hold good for patients with an illness lasting up to 1½ years. With reference to chronic cases I refer to my discussion of this morning. In majority of chronic cases, with the exception of the activation attempts in hebephrenia with loss of affect, a very long protracted shock is desirable. Our colleague Kraulis from Latvia today reported his observations in that connection and they are in encouraging agreement with my own. In this long protracted shock in chronic cases, even in those which are very resistant, the amnesia is apparently a very important element in the treatment, as I have already pointed out in my monograph.

I try to make therapeutic use of the effectiveness of the amnesia also in compulsion neuroses. I can already report to you a few cases in which I succeeded in dimming the actuality of the compulsory ideas and in pushing the content to the background. In none of these cases was there a complete amnesia for the compulsory thoughts, but their actuality was so much lessened that the patients were able to go back to work.

In the matter of the resistance to insulin, it is not clear in many patients whether we are dealing with a hypersensitive compensatory mechanism or with something else. At any rate, I try to make my approach while I have the antagonistic mechanism hoodwinked, so to speak. This is possible in the following way: the patient is kept on very large doses for a considerable time and then is given a half-dose. The antagonistic mechanism, expecting the higher dose, does not react to the half-dose, and the patient goes into coma.

One may frequently induce epileptic seizures in hypoglycemia without cardiazol. Such somatic stimuli as purposely awkward insertion of the nasal tube, or very thorough neurological testing (reflex testing) frequently succeed in provoking a seizure if the stimuli are applied at the time of the patient's susceptibility to convulsions, that is, in the second and third hours.

Although I have presented here a number of clinical observations and notes, I should like to report on an accident that occurred in America. Toward the end of a protracted shock the patient was in a status epilepticus. The physicians quite properly gave intravenous

glucose at once and later adrenalin. Since the seizures were repeated, still more adrenalin was given in spite of a very high blood sugar level. It was overlooked that adrenalin does not increase the blood sugar when the level is already very high but instead increases the tendency to convulsions. In fact this status was maintained for 36 hours with the help of adrenalin and had to be controlled by luminal, ether, and morphine. In spite of the appearance of good circulation, the patient was saved only by oxygen inhalation. It is, in my opinion, absolutely obligatory to use oxygen freely in every kind of status epilepticus in hypoglycemia, even when there are no evident signs of cyanosis. In its injured condition the nerve cell seems to be able to absorb enough oxygen only in the presence of an excess of it.

On the question of vagotonia and sympathicotonia I should like to say that it cannot be a matter of a constant simple tonus of the two parts of the autonomic system. There is rather a constant oscillation between the two, conditioned by the struggle of the endogenous antagonistic mechanism against the insulin. This is important to know in order to be able at the onset of tachycardia to distinguish, whether we are dealing with a harmless transitory overcompensation from the sympathetic side or with a symptom of incipient myocardial insufficiency. In this one cannot depend on the rapid pulse alone but one must take into consideration all the other somatic signs as well as the complexion.

I should like to mention the following considerations in regard to the treatment of stupor. I like to point out the difference between the productive, content-rich, active stupor and that which is empty of content and passive. Naturally, this difference is of importance only in relation to the interruption of the hypoglycemia. Just as the active stupor is best influenced by interruption at the time of deep coma, so the passive stupor benefits from termination of the hypoglycemia during the period of excitation. Naturally, no hard and fast line can be drawn. In passive stupor I often try, and with good results, to obtain a sudden awakening from deep coma by intravenous glucose, and sometimes even to intensify the effect of the latter by intravenous cardiazol, according to v. Meduna's method. With this kind of stupor one can also frequently induce an epileptic seizure by a sudden increase in the dose of insulin.